

Appendix J

Existing SCCLSD Theoretical Gravity Sewer Capacity



Legend

-  Pump Station
-  Manhole

Sewer Main

-  10" Force Main
-  18" Gravity



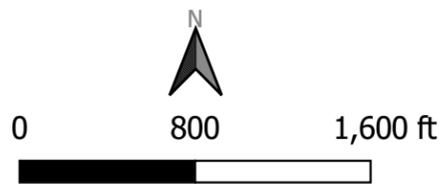


Legend

- ◆ Pump Station
- Manhole

Sewer Main

- 10" Force Main
- 14" Force Main
- 18" Gravity



Chautauqua County
Appendix J
Section 2

Chautauqua County, New York 10/18/2024

Project No. 125.001

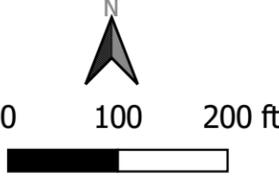


Legend

- ◆ Pump Station
- Manhole

Sewer Main

- 14" Force Main
- 16" Force Main
- 18" Gravity

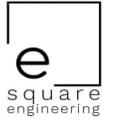


Chautauqua County
Appendix J
Section 3

Chautauqua County, New York 10/18/2024

Project No. 125.001

Project: 125.001
 Subject: Existing Theoretical Gravity Sewer Capacity Calculations
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



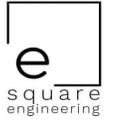
Assumptions

- Flow Area and Hydraulic Radius are calculated based on the pipe being completely full.
- Mannings Value of n = 0.013 per 10 State Standards, Section 33.41
- Upstream Elevation, Downstream Elevation, Elevation Drop, and Length are per provided record drawings

$$Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$$

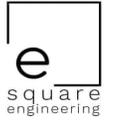
	Size (in)	Actual I.D. (in.)	Material	Upstream Manhole	Upstream El. (per Record Drawings)	Downstream Manhole	Downstream El. (per Record Drawings)	Elevation Drop (ft)*	Length (ft) (per Record Drawings)	Slope, S (ft/ft) (per Record Drawings)	Flow Area, A (ft ²)	Hydraulic Radius, R (ft)	Capacity, Q (cfs)	Capacity (gpm)	Capacity (mgd)	Velocity (ft/s)
Section 1	18	18	Assumed RCP	C1C-I41	1309.58	C1C-I40A	1308.95	0.63	145	0.0044	1.77	0.38	6.93	3,111	4.48	3.92
	18	18	Assumed RCP	C1C-I40A	1308.95	C1C-I40	1307.92	1.03	213	0.0048	1.77	0.38	7.31	3,281	4.72	4.14
	18	18	Assumed RCP	C1C-I40	1307.92	C1C-I39	1307.66	0.26	152	0.0017	1.77	0.38	4.35	1,950	2.81	2.46
	18	18	Assumed RCP	C1C-I39	1307.66	C1C-I38A	1307.45	0.21	114	0.0018	1.77	0.38	4.50	2,021	2.91	2.55
	18	18	Assumed RCP	C1C-I38A	1307.45	C1C-I38	1307.14	0.31	213	0.0015	1.77	0.38	4.01	1,799	2.59	2.27
	18	18	Assumed RCP	C1C-I38	1307.14	C1C-I37	1306.8	0.34	289	0.0012	1.77	0.38	3.60	1,616	2.33	2.04
	18	18	Assumed RCP	C1C-I37	1306.8	C1C-I36	1306.35	0.45	209	0.0021	1.77	0.38	4.87	2,185	3.15	2.76
	18	18	Assumed RCP	C1C-I36	1306.35	C1C-I35A	1306.11	0.24	198	0.0012	1.77	0.38	3.65	1,640	2.36	2.07
	18	18	Assumed RCP	C1C-I35A	1306.11	C1C-I35	1305.95	0.16	128	0.0012	1.77	0.38	3.71	1,664	2.40	2.10
	18	18	Assumed RCP	C1C-I35	1305.95	C1C-I34	1305.68	0.27	301	0.0009	1.77	0.38	3.14	1,411	2.03	1.78
	18	18	Assumed RCP	C1C-I34	1305.68	C1C-I33	1305.38	0.3	302	0.0010	1.77	0.38	3.31	1,487	2.14	1.87
	18	18	Assumed RCP	C1C-I33	1305.38	C1C-I32	1305.3	0.08	95	0.0008	1.77	0.38	3.04	1,366	1.97	1.72
	18	18	Assumed RCP	C1C-I32	1305.3	C1C-I31	1304.95	0.35	293	0.0012	1.77	0.38	3.63	1,629	2.35	2.05
	18	18	Assumed RCP	C1C-I31	1304.95	C1C-I30	1304.85	0.1	69	0.0014	1.77	0.38	4.00	1,793	2.58	2.26
	18	18	Assumed RCP	C1C-I30	1304.85	C1C-I29	1304.6	0.25	247	0.0010	1.77	0.38	3.34	1,500	2.16	1.89
	18	18	Assumed RCP	C1C-I29	1304.6	C1C-I28	1304.1	0.5	367	0.0014	1.77	0.38	3.88	1,740	2.50	2.19
	18	18	Assumed RCP	C1C-I28	1304.1	C1C-I27	1303.97	0.13	66	0.0020	1.77	0.38	4.67	2,098	3.02	2.65
	18	18	Assumed RCP	C1C-I27	1303.97	C1C-I26	1303.71	0.26	184	0.0014	1.77	0.38	3.95	1,774	2.55	2.24
	18	18	Assumed RCP	C1C-I26	1303.71	C1C-I25A	1303.45	0.26	218	0.0012	1.77	0.38	3.63	1,629	2.35	2.05
	18	18	Assumed RCP	C1C-I25A	1303.45	C1C-I25	1303.29	0.16	99	0.0016	1.77	0.38	4.23	1,900	2.74	2.39
18	18	Assumed RCP	C1C-I25	1303.29	C1C-I24	1302.88	0.41	369	0.0011	1.77	0.38	3.50	1,572	2.26	1.98	
18	18	Assumed RCP	C1C-I24	1302.88	C1C-I23	1301.77	1.11	185	0.0060	1.77	0.38	8.14	3,654	5.26	4.61	
18	18	Assumed RCP	C1C-I23	1301.77	C1C-A1	1301.42	0.35	200	0.0017	1.77	0.38	4.39	1,970	2.84	2.48	
18	18	Assumed RCP	C1C-A1	1301.42	C1C-A2	1300.97	0.45	320	0.0014	1.77	0.38	3.94	1,768	2.55	2.23	
18	18	Assumed RCP	C1C-A2	1300.97	C1C-A2A	1300.93	0.04	39	0.0010	1.77	0.38	3.38	1,519	2.19	1.92	
18	18	Assumed RCP	C1C-A2A	1300.93	COLBURNS	1300.85	0.08	34	0.0023	1.77	0.38	5.08	2,280	3.28	2.87	
Section 2	18	18	Assumed RCP	C1C-I20	1402	C1C-I19	1396.02	5.98	302	0.0198	1.77	0.38	14.79	6,637	9.56	8.37
	18	18	Assumed RCP	C1C-I19	1396.02	C1C-I18	1390.67	5.35	324	0.0165	1.77	0.38	13.50	6,059	8.72	7.64
	18	18	Assumed RCP	C1C-I18	1390.67	C1C-I17	1390.27	0.4	269	0.0015	1.77	0.38	4.05	1,818	2.62	2.29
	18	18	Assumed RCP	C1C-I17	1390.27	C1C-I16	1389.63	0.64	302	0.0021	1.77	0.38	4.84	2,171	3.13	2.74
	18	18	Assumed RCP	C1C-I16	1389.63	C1C-I15	1389.08	0.55	297	0.0019	1.77	0.38	4.52	2,028	2.92	2.56
	18	18	Assumed RCP	C1C-I15	1389.08	C1C-I14	1388.6	0.48	308	0.0016	1.77	0.38	4.15	1,860	2.68	2.35
	18	18	Assumed RCP	C1C-I14	1388.6	C1C1-I13A	1388.03	0.57	272	0.0021	1.77	0.38	4.81	2,160	3.11	2.72
	18	18	Assumed RCP	C1C1-I13A	1388.03	C1C-I13	1387.99	0.04	23	0.0017	1.77	0.38	4.37	1,963	2.83	2.47
	18	18	Assumed RCP	C1C-I13	1387.99	C1C-I12	1387.34	0.65	295	0.0022	1.77	0.38	4.93	2,213	3.19	2.79
	18	18	Assumed RCP	C1C-I12	1387.34	C1C-I11	1386.86	0.48	299	0.0016	1.77	0.38	4.21	1,890	2.72	2.38
	18	18	Assumed RCP	C1C-I11	1386.86	C1C-I10	1384.4	2.46	340	0.0072	1.77	0.38	8.93	4,009	5.77	5.05
	18	18	Assumed RCP	C1C-I10	1384.4	C1C-I9	1382.35	2.05	297	0.0069	1.77	0.38	8.72	3,914	5.64	4.94
	18	18	Assumed RCP	C1C-I9	1382.35	C1C-I8	1373.16	9.19	298	0.0308	1.77	0.38	18.43	8,273	11.91	10.43
	18	18	Assumed RCP	C1C-I8	1373.16	C1C-I7	1362.5	10.66	303	0.0352	1.77	0.38	19.71	8,846	12.74	11.15
	18	18	Assumed RCP	C1C-I7	1362.5	C1C-I6	1352.24	10.26	262	0.0391	1.77	0.38	20.78	9,326	13.43	11.76
	18	18	Assumed RCP	C1C-I6	1352.24	C1C-I5	1349.39	2.85	233	0.0122	1.77	0.38	11.62	5,216	7.51	6.58
	18	18	Assumed RCP	C1C-I5	1349.39	C1C-I4	1348.98	0.41	296	0.0014	1.77	0.38	3.91	1,755	2.53	2.21
	18	18	Assumed RCP	C1C-I4	1348.98	C1C-I3	1348.36	0.62	306	0.0020	1.77	0.38	4.73	2,122	3.06	2.68

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	Size (in)	Actual I.D. (in.)	Material	Upstream Manhole	Upstream El. (per Record Drawings)	Downstream Manhole	Downstream El. (per Record Drawings)	Elevation Drop (ft)*	Length (ft) (per Record Drawings)	Slope, S (ft/ft) (per Record Drawings)	Flow Area, A (ft ²)	Hydraulic Radius, R (ft)	Capacity, Q (cfs)	Capacity (gpm)	Capacity (mgd)	Velocity (ft/s)
Section 2	18	18	Assumed RCP	C1C-13	1348.36	C1C-12	1342.53	5.83	294	0.0198	1.77	0.38	14.79	6,637	9.56	8.37
	18	18	Assumed RCP	C1C-12	1342.53	C1C-11	1331.81	10.72	303	0.0353	1.77	0.38	19.74	8,862	12.76	11.17
	18	18	Assumed RCP	C1C-11	1331.81	C8-35	1325.29	6.52	73	0.0888	1.77	0.38	31.31	14,052	20.23	17.72
	18	18	Assumed RCP	C8-35	1325.29	C8-34	1323.7	1.59	416	0.0038	1.77	0.38	6.50	2,916	4.20	3.68
	18	18	Assumed RCP	C8-34	1323.7	C8-33	1322.81	0.89	504	0.0018	1.77	0.38	4.42	1,982	2.85	2.50
	18	18	Assumed RCP	C8-33	1322.81	C8-32	1316.96	5.85	175	0.0335	1.77	0.38	19.23	8,629	12.43	10.88
	18	18	Assumed RCP	C8-32	1316.96	C8-31A	1314.5	2.46	309	0.0080	1.77	0.38	9.38	4,209	6.06	5.31
	18	18	Assumed RCP	C8-31A	1314.5	C8-31	1313.85	0.65	96	0.0068	1.77	0.38	8.64	3,879	5.59	4.89
	18	18	Assumed RCP	C8-31	1313.85	C8-30	1311.31	2.54	289	0.0088	1.77	0.38	9.85	4,420	6.36	5.57
	18	18	Assumed RCP	C8-30	1311.31	C8-29	1310.96	0.35	286	0.0012	1.77	0.38	3.67	1,648	2.37	2.08
	18	18	Assumed RCP	C8-29	1310.96	C8-28	1310.17	0.79	295	0.0027	1.77	0.38	5.44	2,441	3.51	3.08
	18	18	Assumed RCP	C8-28	1310.17	C8-27	1309.81	0.36	384	0.0009	1.77	0.38	3.22	1,444	2.08	1.82
	18	18	Assumed RCP	C8-27	1309.81	C8-25	1309.72	0.09	190	0.0005	1.77	0.38	2.29	1,027	1.48	1.29
	18	18	Assumed RCP	C8-25	1309.72	C8-24	1309.67	0.05	26	0.0019	1.77	0.38	4.59	2,061	2.97	2.60
	18	18	Assumed RCP	C8-24	1309.67	C8-23	1309.3	0.37	192	0.0019	1.77	0.38	4.61	2,070	2.98	2.61
	18	18	Assumed RCP	C8-23	1309.3	C8-21	1308.99	0.31	280	0.0011	1.77	0.38	3.49	1,569	2.26	1.98
	18	18	Assumed RCP	C8-20	1308.99	C8-21	1308.82	0.17	98	0.0017	1.77	0.38	4.37	1,960	2.82	2.47
	18	18	Assumed RCP	C8-20	1308.82	C8-19	1308.45	0.37	267	0.0014	1.77	0.38	3.91	1,755	2.53	2.21
	18	18	Assumed RCP	C8-19	1308.45	C8-18	1307.98	0.47	331	0.0014	1.77	0.38	3.96	1,777	2.56	2.24
	18	18	Assumed RCP	C8-18	1307.98	C8-17	1307.64	0.34	184	0.0019	1.77	0.38	4.52	2,029	2.92	2.56
	18	18	Assumed RCP	C8-17	1307.64	C8-16	1307.17	0.47	355	0.0013	1.77	0.38	3.82	1,716	2.47	2.16
	18	18	Assumed RCP	C8-16	1307.17	C8-15	1307.08	0.09	48	0.0019	1.77	0.38	4.53	2,031	2.92	2.56
	18	18	Assumed RCP	C8-15	1307.08	C8-14	1306.69	0.39	309	0.0013	1.77	0.38	3.73	1,674	2.41	2.11
	18	18	Assumed RCP	C8-14	1306.69	CHY-1	1306.39	0.3	180	0.0017	1.77	0.38	4.29	1,927	2.77	2.43
	18	18	Assumed RCP	CHY-1	1306.69	C8-13	1306.39	0.3	48	0.0062	1.77	0.38	8.27	3,710	5.34	4.68
	18	18	Assumed RCP	C8-13	1306.39	C8-12	1305.86	0.53	427	0.0012	1.77	0.38	3.70	1,661	2.39	2.09
	18	18	Assumed RCP	C8-12	1305.86	C8-11	1305.52	0.34	275	0.0012	1.77	0.38	3.69	1,657	2.39	2.09
	18	18	Assumed RCP	C8-11	1305.52	C8-10	1305	0.52	400	0.0013	1.77	0.38	3.79	1,700	2.45	2.14
	18	18	Assumed RCP	C8-10	1305	C8-9	1304.76	0.24	151	0.0016	1.77	0.38	4.18	1,878	2.70	2.37
	18	18	Assumed RCP	C8-9	1304.76	C8-8	1304.27	0.49	352	0.0014	1.77	0.38	3.92	1,758	2.53	2.22
	18	18	Assumed RCP	C8-8	1304.27	C8-7	1303.78	0.49	220	0.0022	1.77	0.38	4.96	2,226	3.21	2.81
	18	18	Assumed RCP	C8-7	1303.78	C8-6	1303.5	0.28	198	0.0014	1.77	0.38	3.95	1,773	2.55	2.24
	18	18	Assumed RCP	C8-6	1303.5	C8-5	1303.16	0.34	272	0.0013	1.77	0.38	3.71	1,667	2.40	2.10
18	18	Assumed RCP	C8-5	1303.16	C8-4	1302.82	0.34	184	0.0018	1.77	0.38	4.51	2,026	2.92	2.55	
18	18	Assumed RCP	C8-4	1302.82	C8-3	1302.55	0.27	190	0.0014	1.77	0.38	3.96	1,777	2.56	2.24	
18	18	Assumed RCP	C8-3	1302.55	C8-2	1302.22	0.33	296	0.0011	1.77	0.38	3.51	1,574	2.27	1.99	
18	18	Assumed RCP	C8-2	1302.22	C8-1	1301.77	0.45	392	0.0011	1.77	0.38	3.56	1,598	2.30	2.02	
18	18	Assumed RCP	C7-48	1302.42	TOWNLINE	1302.3	0.12	56	0.0022	1.77	0.38	4.87	2,187	3.15	2.76	

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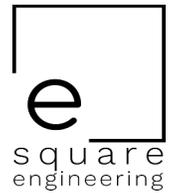


	Size (in)	Actual I.D. (in.)	Material	Upstream Manhole	Upstream El. (per Record Drawings)	Downstream Manhole	Downstream El. (per Record Drawings)	Elevation Drop (ft)*	Length (ft) (per Record Drawings)	Slope, S (ft/ft) (per Record Drawings)	Flow Area, A (ft ²)	Hydraulic Radius, R (ft)	Capacity, Q (cfs)	Capacity (gpm)	Capacity (mgd)	Velocity (ft/s)
Section 3	18	17.564	PVC	C7-10	1309.27	C7-9	1308.69	0.58	197	0.0029	1.68	0.37	5.34	2,397	3.45	3.02
	18	17.564	PVC	C7-9	1308.69	C7-8A	1308.02	0.67	270	0.0025	1.68	0.37	4.90	2,199	3.17	2.77
	18	17.564	PVC	C7-8A	1308.02	C7-8	1307.92	0.1	14	0.0071	1.68	0.37	8.26	3,709	5.34	4.68
	18	17.564	PVC	C7-8	1307.92	C7-7A	1307.52	0.4	175	0.0023	1.68	0.37	4.71	2,112	3.04	2.66
	18	17.564	PVC	C7-7A	1307.52	C7-7	1307.08	0.44	156	0.0028	1.68	0.37	5.22	2,345	3.38	2.96
	18	17.564	PVC	C7-7	1307.08	C7-6	305.64	1.44	168	0.0086	1.68	0.37	9.10	4,086	5.88	5.15
	18	17.564	PVC	C7-6	1305.64	C7-5	1304.09	1.55	418	0.0037	1.68	0.37	5.99	2,689	3.87	3.39
	18	17.564	PVC	C7-5	1304.09	C7-4	1303.68	0.41	73	0.0056	1.68	0.37	7.36	3,303	4.76	4.16
	18	17.564	PVC	C7-4	1303.68	C7-3	1302.74	0.94	250	0.0038	1.68	0.37	6.03	2,706	3.90	3.41
	18	17.564	PVC	C7-3	1302.74	C7-2	1302.65	0.09	29	0.0031	1.68	0.37	5.48	2,459	3.54	3.10
	18	17.564	PVC	C7-2	1302.65	C7-1	1301.81	0.84	212	0.0040	1.68	0.37	6.19	2,778	4.00	3.50
	18	17.564	PVC	C7-1	1301.81	BONITA	1301.73	0.08	63	0.0013	1.68	0.37	3.51	1,575	2.27	1.99
	30	30	RCP	PLA-1	1314.85	PLA-2	1314.6	0.25	85	0.0029	4.91	0.63	22.26	9,992	14.39	4.54
	30	30	RCP	PLA-2	1314.6	PLA-3	1313.9	0.7	130	0.0054	4.91	0.63	30.04	13,484	19.42	6.12
	36	36	RCP	PLA-3	1313.4	PLA-4	1313.19	0.21	75	0.0028	7.07	0.75	35.33	15,857	22.83	5.00
36	36	RCP	PLA-4	1313.19	WWTP	1313.13	0.06	18	0.0033	7.07	0.75	38.30	17,190	24.75	5.42	

Appendix K

Preliminary Flows and Loads Calculations

Project: 125.001
Subject: Preliminary Flow and Load Summary
Calculated by: AJM
Checked by: MJZ
Date: 11/12/2024



New Sanitary Sewer Collection Flow Estimates per Standards

10 State Standards

Average Daily Flow:	100	gpd/capita		
Typ. Single Family Home:	2.5	people	=	250 gpd/EDU
Peaking Factor Range:	3 to 4		=	750 to 1,000 gpd/EDU
Note: Allows for actual water use or other data to be utilized				

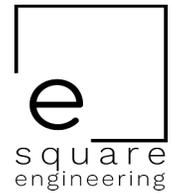
TR-16

Average Daily Flow:	70	gpd/capita		
Typ. Single Family Home:	2.5	people	=	175 gpd/EDU
Peaking Factor Range:	3 to 5		=	525 to 875 gpd/EDU
Note: Add in additional 250-500 gpd/in. diameter/mile for I-I				
Note: Allows for actual water use or other data to be utilized				

NYS DEC

Average Daily Flow:	
Dwelling Unit =	100 gpd/bedroom
Day Camp =	25 gal./person/day (includes lunch & shower)
Campground =	
55	gpd/unsewered site (includes shower)
100	gpd/sewered site with water hookup
55	gpd/sewered site without water hookup
10	additional gpd/unsewered site if dump station present
5	additional gpd/sewered site if dump station present
Note: Allows for actual water use or other data to be utilized	

Project: 125.001
 Subject: Preliminary Flow and Load Summary
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



Existing Relevant Flow Data

NCLSD WWTP

Average Daily Flow:	200	gpd/EDU	<i>Includes significant I-I; largely clay piping</i>
Max. Day Flow:	1,700	gpd/EDU	<i>Includes significant I-I and high peaking factor</i>

SCCLSD WWTP

Average Daily Flow:	366	gpd/EDU	<i>Includes commercial users and significant I-I</i>
Max. Day Flow:	1,781	gpd/EDU	<i>Includes significant I-I and high peaking factor</i>

SCCLSD West Side Extension Phase 1

Number of EDUs:	420		
Original Estimated Design Flows:			
Est. Avg. Daily Flow:	109,440	gpd	= 261 gpd/EDU
Est. Peak Hour Flow:	404,929	gpd	= 964 gpd/EDU
Actual Flows:			
Note: Includes limited metered flow data from July 25, 2024 to August 19, 2024			
Average Daily Flow:	44,200	gpd	= 105 gpd/EDU
Max. Day Flow:	58,300	gpd	= 139 gpd/EDU

(T) Chautauqua Sewer District No. 1 (Chatauqua Lake Estates and Villas at Chautauqua Point)

Type:	Existing Sewer District - Already Sewered		
Note:	Data taken from existing flow meter data from February 2022 to July 2024		
Number of Users:	171	Townhomes	
Overall Avg. Daily Flow:	17,300	gpd	= 101 gpd/EDU
Overall Max. Day Flow:	60,400	gpd	= 353 gpd/EDU
Avg. Summer Day Flow:	20,250	gpd	= 118 gpd/EDU
Max. Summer Day Flow:	46,400	gpd	= 271 gpd/EDU

Bayberry Landing

Note:	Flows based on DMR data provided by NYS DEC		
Overall Avg. Daily Flow:	90	gpd/Condo	
Max. Summer Day Flow:	200	gpd/Condo	
Overall Max. Day Flow:	440	gpd/Condo	<i>Winter snowmelt</i>

Crosswinds Marina Community

Note:	Flows based on DMR data provided by NYS DEC		
Overall Avg. Daily Flow:	86	gpd/Condo	
Max. Summer Day Flow:	158	gpd/Condo	
Overall Max. Day Flow:	493	gpd/Condo	<i>Winter snowmelt</i>

USDA Campground Study

Note:	Per USDA Study: <i>Water User in Forest Service Recreation Areas: Guideline for Water System Designers</i> , September 2007		
Camp Facility with toilets and showers:	20 - 40 gpd/site		
Individual Campsites with water & sewer connection:	30 gpd/site		

Selected Design Flows by Property Type

Note: Design standards allow for the use of real world data to justify flow calculations. In review of both design standards and real world data, flows were calculated for properties without flow data utilizing the flow estimates listed below. Should this project proceed into the design phase, estimated flow data contained in this report should be revisited and confirmed by the design engineer.

Townhomes/Condominiums

Design Average Day Flow (ADF):	175	gpd
Design Peak Day Flow (PDF):	275	gpd
Hydraulic Peak Flow:	350	gpd

Single Family Home

Design Average Day Flow (ADF):	225	gpd
Design Peak Day Flow (PDF):	325	gpd
Hydraulic Peak Flow:	450	gpd

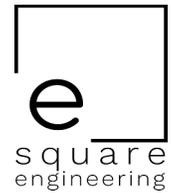
Campgrounds

Temporary Campsites with Water, No Sewer, and Dumping Available		
Design Average Day Flow (ADF):	30	gpd
Design Peak Day Flow (PDF):	60	gpd
Permanent Campsites with Water, No Sewer, and Dumping Available		
Design Average Day Flow (ADF):	50	gpd
Design Peak Day Flow (PDF):	75	gpd
Cabins without Facilities		
Design Average Day Flow (ADF):	30	gpd
Design Peak Day Flow (PDF):	60	gpd
Cabins with Facilities		
Design Average Day Flow (ADF):	75	gpd
Design Peak Day Flow (PDF):	100	gpd
Permanent Campsites with Water & Sewer		
Design Average Day Flow (ADF):	100	gpd
Design Peak Day Flow (PDF):	150	gpd

Camps

Design Average Day Flow (ADF):	30	gal/person
Design Peak Day Flow (PDF):	50	gal/person

Project: 125.001
Subject: Preliminary Flow and Load Summary
Calculated by: AJM
Checked by: MJZ
Date: 11/12/2024



New Sanitary Sewer Collection System Load Estimates per Standards

10 State Standards

BOD ₅	0.17	ppd/capita	=	203.8	mg/L	@	100	gpd/capita
TSS	0.20	ppd/capita	=	239.8	mg/L	@	100	gpd/capita
TKN	0.036	ppd/capita	=	43	mg/L	@	100	gpd/capita

TR-16

CBOD ₅	0.17	ppd/capita	=	203.8	mg/L	@	100	gpd/capita
TSS	0.20	ppd/capita	=	239.8	mg/L	@	100	gpd/capita
TKN	0.04	ppd/capita	=	48	mg/L	@	100	gpd/capita
TP	0.006	ppd/capita	=	7.2	mg/L	@	100	gpd/capita

NYSDEC

BOD ₅	155	to	286	mg/L
TSS	155	to	330	mg/L
TKN	6	to	12	mg/L
TP	4	to	13	mg/L

Wastewater Engineering Treatment and Resource Recovery, 5th Edition (Metcalf & Eddy, Inc.)

Per Table 3-18 - Typical Composition of Untreated Domestic Wastewater

BOD ₅	0.167	ppd/capita	=	200	mg/L	@	100	gpd/capita
TSS	0.163	ppd/capita	=	195	mg/L	@	100	gpd/capita
Free NH ₄	0.017	ppd/capita	=	20	mg/L	@	100	gpd/capita
TP	0.005	ppd/capita	=	5.6	mg/L	@	100	gpd/capita

Existing Relevant Loading Data

NCLSD WWTP

Average Daily Flow:	0.321	MGD		
No. of EDUs:	1,595.3			
BOD ₅	155 mg/L = 415 ppd	= 0.10 ppd/capita	= 0.26 ppd/EDU	
	- Peak to Average Ratio:	2.0		
TSS	132 mg/L = 353.4 ppd	= 0.089 ppd/capita	= 0.222 ppd/EDU	
	- Peak to Average Ratio:	2.2		
NH ₄	24.46 mg/L = 65.5 ppd	= 0.016 ppd/capita	= 0.041 ppd/EDU	
	- Peak to Average Ratio:	2.0		
TP	3.5 mg/L = 9.37 ppd	= 0.002 ppd/capita	= 0.006 ppd/EDU	
	- Peak to Average Ratio:	1.9		

SCCLSD WWTP

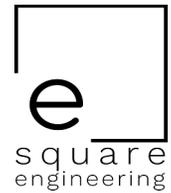
Average Daily Flow:	2.05	MGD		
No. of EDUs:	5,614			
CBOD ₅	155 mg/L = 2,650 ppd	= 0.19 ppd/capita	= 0.472 ppd/EDU	
	- Peak to Average Ratio:	1.7		
TSS	145 mg/L = 2,479 ppd	= 0.177 ppd/capita	= 0.44 ppd/EDU	
	- Peak to Average Ratio:	1.41		
NH ₄	13.84 mg/L = 236.6 ppd	= 0.017 ppd/capita	= 0.042 ppd/EDU	
	- Peak to Average Ratio:	1.3		
TKN	24.27 mg/L = 414.9 ppd	= 0.030 ppd/capita	= 0.074 ppd/EDU	
	- Peak to Average Ratio:	1.54		
TP	2.96 mg/L = 50.61 ppd	= 0.004 ppd/capita	= 0.009 ppd/EDU	
	- Peak to Average Ratio:	1.27		

Selected Sanitary Sewer Load Concentrations

Note: Design standards allow for the use of real world data to justify loading design. In review of both design standards and real world data, lows were estimated based on the following concentrations. Should this project proceed into the design phase, estimated loading data contained in this report should be revisited and confirmed by the design engineer.

BOD ₅	At Average Daily Flow:	240	mg/L
	Peak Loading:	480	mg/L
TSS	At Average Daily Flow:	240	mg/L
	Peak Loading:	480	mg/L
NH ₄	At Average Daily Flow:	24	mg/L
	Peak Loading:	48	mg/L
TP	At Average Daily Flow:	5.6	mg/L
	Peak Loading:	11.2	mg/L

Project: 125.001
 Subject: Preliminary Flow and Load Calculations
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



Estimated Flows by Sub-Area

Potential Golf Course Development

Type: Mixed Development

Parcel Nos: 26.15-1-22, 263.15-1-21.1, 263.10-2-2.2, 263.10-2-2.1

No. of Usage EDUs: 227 *138 Townhomes, 40 Condos, 39 Homes - 1 EDU
Commercial Space - 10 EDUs Total*

Est. Avg. Day Flow: 175 gpd/EDU = 39,725 gpd
 Est. Max. Day Flow (Summer): 275 gpd/EDU = 62,425 gpd
 Est. Max. Day Flow (Entire Year): 350 gpd/EDU = 79,450 gpd

Point Chautauqua

Type: Single Family Homes

No. of Usage EDUs: 104 *Based on Property Class Codes*

Est. Avg. Day Flow: 225 gpd/EDU = 23,400 gpd
 Est. Max. Day Flow (Summer): 325 gpd/EDU = 33,800 gpd
 Est. Max. Day Flow (Entire Year): 450 gpd/EDU = 46,800 gpd

Dewittville

Neighborhood Areas

Type: Single Family Home

No. of Usage EDUs: 96 *Based on Property Class Codes*

Est. Avg. Day Flow: 225 gpd/EDU = 21,600 gpd
 Est. Max. Day Flow (Summer): 325 gpd/EDU = 31,200 gpd
 Est. Max. Day Flow (Entire Year): 450 gpd/EDU = 43,200 gpd

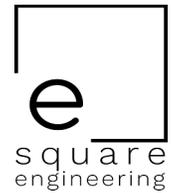
Creek & Lake Campground

Type: Permanent Campsites with Water & Sewer

No. of Sites: 47

Est. Avg. Daily Flow: 100 gpd/Site = 4,700 gpd
 Est. Max. Day Flow (Summer): 150 gpd/Site = 7,050 gpd
 Est. Max. Day Flow (Entire Year): 150 gpd/Site = 7,050 gpd

Project: 125.001
 Subject: Preliminary Flow and Load Calculations
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



Southern Town of Chautauqua

Neighborhood Areas

Type: Single Family Homes & Commerical Users
 (Commerical users were converted to single family home equivalent EDUs)

No. of Usage EDUs: 15 *Based on Property Class Codes*
 Est. Avg. Day Flow: 225 gpd/EDU = 3,375 gpd
 Est. Max. Day Flow (Summer): 325 gpd/EDU = 4,875 gpd
 Est. Max. Day Flow (Entire Year): 450 gpd/EDU = 6,750 gpd

YMCA Camp Onyasha

Type: Camps
 No. of Sites: 9
 No. of Usage EDUs: 4.5 *9 Buildings. 0.5 EDUs per building.*
 Typ. Summer Pop.: 150 *Reported by Camp Staff*
 Est. Avg. Day Flow: 30 gpd/person = 4,500 gpd
 Est. Max. Day Flow (Summer): 50 gpd/person = 7,500 gpd
 Est. Max. Day Flow (Entire Year): 50 gpd/person = 7,500 gpd

Bayberry Landing

Type: Townhomes/Condominiums
 No. of Usage EDUs: 33 *33 Unit Condominium Development*
 SPDES Permit Limit: 11,200 gpd
 Est. Avg. Day Flow: 2,600 gpd *Based on DMRs provided by NYSDEC*
 Est. Max. Day Flow (Summer): 14,500 gpd *Based on DMRs provided by NYSDEC*
 Est. Max. Day Flow (Entire Year): 14,500 gpd *Based on DMRs provided by NYSDEC*

KOA Campground

Type: Temporary Campsites
 No. of Usage EDUs: 125.5 *0.5 EDUs per site.*
 Total No. of Sites: 251
 Water, No Sewer 24 => ADF: 30 gpd/Site PDF: 75 gpd/Site
 Water, Sewer 227 => ADF: 75 gpd/Site PDF: 100 gpd/Site
 SPDES Permit Limit: 10,000 gpd

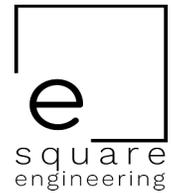
Water Data

Est. Avg. Day Flow: 4,000 gpd *Summer Months. Per camp staff.*
 Calc. ADF per Site: 19 gpd

Sewer Design Flows

Est. Avg. Day Flow: 17,745 gpd
 Est. Max. Day Flow (Summer): 24,500 gpd
 Est. Max. Day Flow (Entire Year): 24,500 gpd

Project: 125.001
Subject: Preliminary Flow and Load Calculations
Calculated by: AJM
Checked by: MJZ
Date: 11/12/2024



North Ellery 1

Neighborhood Areas

Type: Single Family Homes & Commerical Users

(Commerical users were converted to single family home equivalent EDUs)

No. of Usage EDUs:	13	Based on Property Class Codes		
Est. Avg. Day Flow:	225	gpd/EDU	=	2,925 gpd
Est. Max. Day Flow (Summer):	325	gpd/EDU	=	4,225 gpd
Est. Max. Day Flow (Entire Year):	450	gpd/EDU	=	5,850 gpd

Crosswinds Marina Community

Type: Townhomes/Condominiums

No. of Usage EDUs:	43	Based in Property Class Codes		
SPDES Permit Limit:	20,800	gpd		
Est. Avg. Day Flow:	3,700	gpd	Based on DMRs provided by NYSDEC	
Est. Max. Day Flow (Summer):	8,800	gpd	Based on DMRs provided by NYSDEC	
Est. Max. Day Flow (Entire Year):	21,200	gpd	Based on DMRs provided by NYSDEC	

Camp Mission Meadows

Type: Camp

SPDES Permit Limit:	15,000	gpd		
No. of Usage EDUs:	8.8	Annual Water Use 616,100 gal./70,000 gal./EDU = 8.8 EDUs		
Typical Population:	100	Per Camp Staff		
Peak Population:	150	Per Camp Staff		

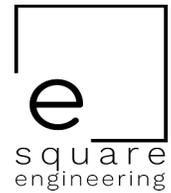
Water Data

Est. Avg. Daily Flow:	1,900	gpd	Water meter data from July 2023 to June 2024
Est. Max. Month Flow:	3,200	gpd	August 2023 Water Usage

Sewer Design Flows

Est. Avg. Day Flow:	2,850	gpd	1.5 times Water Usage
Est. Max. Day Flow (Summer):	4,800	gpd	1.5 times Water Usage
Est. Max. Day Flow (Entire Year):	6,400	gpd	2 times Water Usage

Project: 125.001
Subject: Preliminary Flow and Load Calculations
Calculated by: AJM
Checked by: MJZ
Date: 11/12/2024



North Ellery 2

Neighborhood Areas

Type: Single Family Homes & Commerical Users

(Commerical users were converted to single family home equivalent EDUs)

No. of Usage EDUs:	38	<i>Based on Property Class Codes</i>	
Est. Avg. Day Flow:	225	gpd/EDU =	8,550 gpd
Est. Max. Day Flow (Summer):	325	gpd/EDU =	12,350 gpd
Est. Max. Day Flow (Entire Year):	450	gpd/EDU =	17,100 gpd

Chedwell Club

Type: Townhomes/Condominiums

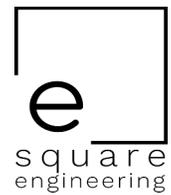
No. of Usage EDUs:	14	<i>14 Housing Units on Site</i>	
SPDES Permit Limit:	13,000	gpd	
Est. Avg. Day Flow:	175	gpd/EDU =	2,450 gpd
Est. Max. Day Flow (Summer):	275	gpd/EDU =	3,850 gpd
Est. Max. Day Flow (Entire Year):	350	gpd/EDU =	4,900 gpd

Lake Chautauqua Lutheran Center

Type: Permanent Campsites with Water & Sewer

No. of Sites:	14		
No. of Usage EDUs:	7	<i>14 Structures Total. 0.5 EDU per structure.</i>	
SPDES Permit Limit:	10,000	gpd	
Est. Avg. Day Flow:	100	gpd/Site =	1,400 gpd
Est. Max. Day Flow (Summer):	150	gpd/Site =	2,100 gpd
Est. Max. Day Flow (Entire Year):	150	gpd/Site =	2,100 gpd

Project: 125.001
 Subject: Preliminary Flow and Load Calculations
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



North Ellery 3

Neighborhood Areas

Type: Single Family Homes & Commerical Users
 (Commerical users were converted to single family home equivalent EDUs)
 No. of Usage EDUs: 23 *Based on Property Class Codes*
 Est. Avg. Day Flow: 225 gpd/EDU = 5,175 gpd
 Est. Max. Day Flow (Summer): 325 gpd/EDU = 7,475 gpd
 Est. Max. Day Flow (Entire Year): 450 gpd/EDU = 10,350 gpd

The Boys JIM Club of America

Type: Camps
 No. of Usage EDUs: 3.1 *Q1: 1 EDU, Q2: 3.4 EDU, Q3: 7.1 EDU, Q4: 1 EDU*
 Typical Population: 80 *Per Camp Staff*
 Peak Population: 100 *Per Camp Staff*
 SPDES Permit Limit: 6,000 gpd *4 Septic Systems * 1,500 gpd per septic system*

Water Data

Est. Avg. Day Flow: 2,000 gpd *Summer Months. Per camp staff.*
 Est. Max. Day Flow: 4,000 gpd *2 * Max. Month Flow*

Sewer Design Flows

Est. Avg. Day Flow: 30 gpd/person = 2,400 gpd *Typical Pop.*
 Est. Max. Day Flow (Summer): 50 gpd/person = 5,000 gpd *Peak Pop.*
 Est. Max. Day Flow (Entire Year): 50 gpd/person = 5,000 gpd *Peak Pop.*

Viking Lodge Lake Park

Type: Permanent Campsites with Water, No Sewer, and Dumping Available
 No. of Sites: 141
 No. of Usage EDUs: 73.5 *141 Total Sites. 0.5 EDUs per site. 3 EDUs for Restaurant*
 SPDES Permit Limit: 2,500 gpd *Only for septic system near restaurant*

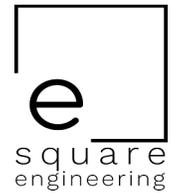
Water Data

Est. Max. Month Flow: 4,000 gpd *Water meter data from August 2024*

Sewer Design Flows

Est. Avg. Day Flow: 50 gpd/Site = 7,050 gpd
 Est. Max. Day Flow (Summer): 75 gpd/Site = 10,575 gpd
 Est. Max. Day Flow (Entire Year): 75 gpd/Site = 10,575 gpd

Project: 125.001
 Subject: Preliminary Flow and Load Calculations
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/12/2024



Summary of Estimated Flows & Loads - Sub-Areas North of Dewittville Creek

Includes: Potential Golf Course Development, Point Chautauqua, Dewittville

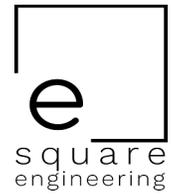
<u>Flows</u>			
Est. Avg. Day Flow:	89,425	gpd	= 62 gpm
Est. Max. Day Flow (Summer):	134,475	gpd	= 93 gpm
Est. Peak Day Flow (Entire Year):	176,500	gpd	= 123 gpm
<u>Loads</u>			
	@ Average Day Flow:	240	mg/L = 179 ppd
BOD ₅	@ Max. Day Flow (Summer):	480	mg/L = 538.3 ppd
	@ Max. Day Flow (Entire Year):	240	mg/L = 353.3 ppd
	@ Average Day Flow:	240	mg/L = 179 ppd
TSS	@ Max. Day Flow (Summer):	480	mg/L = 538.3 ppd
	@ Max. Day Flow (Entire Year):	240	mg/L = 353.3 ppd
	@ Average Day Flow:	24	mg/L = 17.9 ppd
NH ₄	@ Max. Day Flow (Summer):	48	mg/L = 53.83 ppd
	@ Max. Day Flow (Entire Year):	24	mg/L = 35.33 ppd
	@ Average Day Flow:	5.6	mg/L = 4.177 ppd
TP	@ Max. Day Flow (Summer):	11.2	mg/L = 12.56 ppd
	@ Max. Day Flow (Entire Year):	5.6	mg/L = 8.243 ppd

Summary of Estimated Flows & Loads - Sub-Areas South of Dewittville Creek

Includes: Southern Town of Chautauqua, North Ellery 1, North Ellery 2, North Ellery 3

<u>Flows</u>			
Est. Avg. Day Flow:	64,720	gpd	= 45 gpm
Est. Max. Day Flow (Summer):	110,550	gpd	= 77 gpm
Est. Peak Day Flow (Entire Year):	136,725	gpd	= 95 gpm
<u>Loads</u>			
	@ Average Day Flow:	240	mg/L = 129.5 ppd
BOD ₅	@ Max. Day Flow (Summer):	480	mg/L = 442.6 ppd
	@ Max. Day Flow (Entire Year):	240	mg/L = 273.7 ppd
	@ Average Day Flow:	240	mg/L = 129.5 ppd
TSS	@ Max. Day Flow (Summer):	480	mg/L = 442.6 ppd
	@ Max. Day Flow (Entire Year):	240	mg/L = 273.7 ppd
	@ Average Day Flow:	24	mg/L = 12.95 ppd
NH ₄	@ Max. Day Flow (Summer):	48	mg/L = 44.26 ppd
	@ Max. Day Flow (Entire Year):	24	mg/L = 27.37 ppd
	@ Average Day Flow:	5.6	mg/L = 3.023 ppd
TP	@ Max. Day Flow (Summer):	11.2	mg/L = 10.33 ppd
	@ Max. Day Flow (Entire Year):	5.6	mg/L = 6.386 ppd

Project: 125.001
 Subject: Preliminary Flow and Load Calculations
 Calculated by: AJM
 Checked by: MJZ
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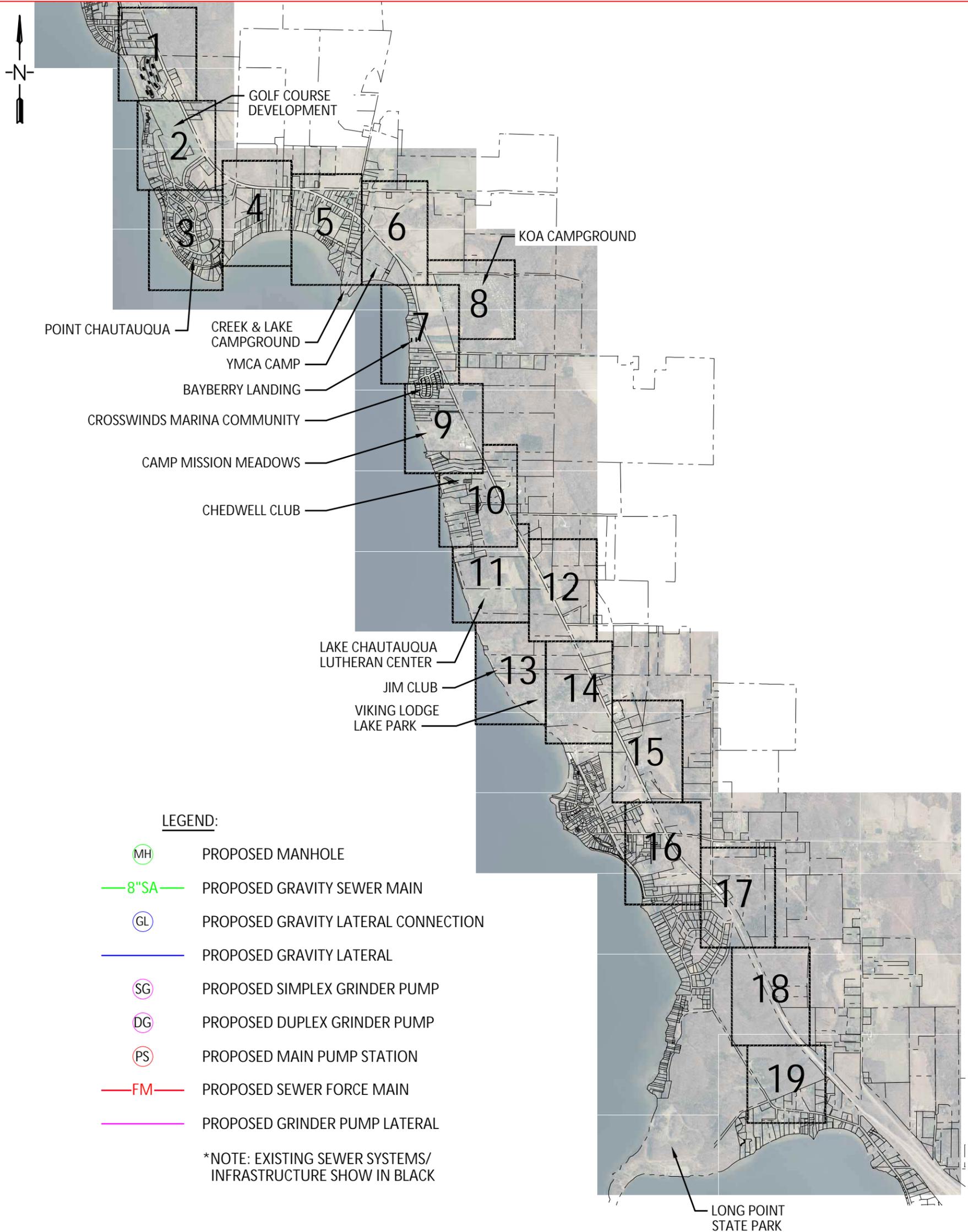
Totals for Entire Study Area

<u>Flows</u>			
Est. Avg. Day Flow:	154,145	gpd	= 107 gpm
Est. Max. Day Flow (Summer):	245,025	gpd	= 170 gpm
Est. Peak Day Flow (Entire Year):	313,225	gpd	= 218 gpm
<u>Loads</u>			
	@ Average Day Flow:	309	ppd
BOD ₅	@ Max. Day Flow (Summer):	981	ppd
	@ Max. Day Flow (Entire Year):	627	ppd
	@ Average Day Flow:	309	ppd
TSS	@ Max. Day Flow (Summer):	981	ppd
	@ Max. Day Flow (Entire Year):	627	ppd
	@ Average Day Flow:	31	ppd
NH ₄	@ Max. Day Flow (Summer):	98	ppd
	@ Max. Day Flow (Entire Year):	63	ppd
	@ Average Day Flow:	7	ppd
TP	@ Max. Day Flow (Summer):	23	ppd
	@ Max. Day Flow (Entire Year):	15	ppd

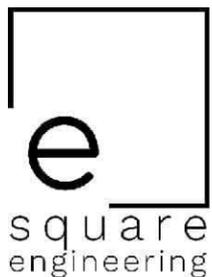
Appendix L

Hybrid Collection System – Option 1 – Preliminary Layout

**COLLECTION SYSTEM ALTERNATIVE NO. 1 - "HYBRID" COLLECTION SYSTEM
 OPTION NO. 1 - CONVEYANCE TO SCLSD WWTP (WITH GOLF COURSE DEVELOPMENT)
 PRELIMINARY COLLECTION SYSTEM LAYOUT**



Note: Layouts are preliminary and are largely utilized for estimating quantities of piping required. Size and locations of infrastructure subject to change and shall be verified design engineer during final project design.

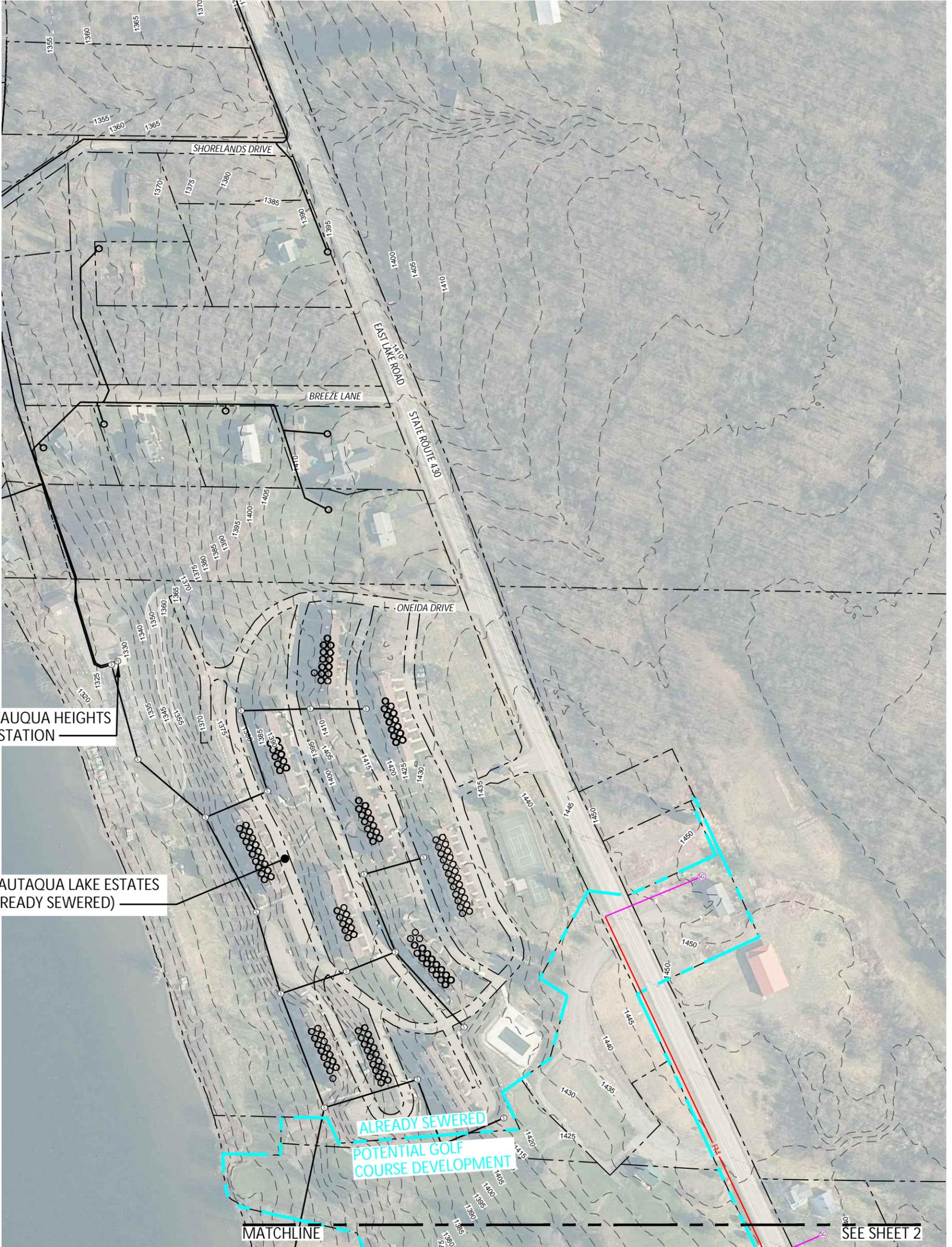
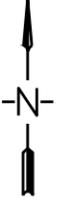


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE

SHEET INDEX

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Checked by: MJZ	Set: PRELIMINARY

Sheet No: _____



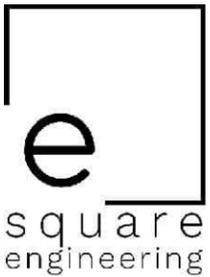
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PUMP STATION

CHAUTAQUA LAKE ESTATES
(ALREADY SEWERED)

ALREADY SEWERED
POTENTIAL GOLF COURSE DEVELOPMENT

MATCHLINE

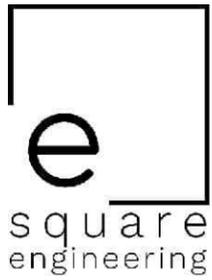
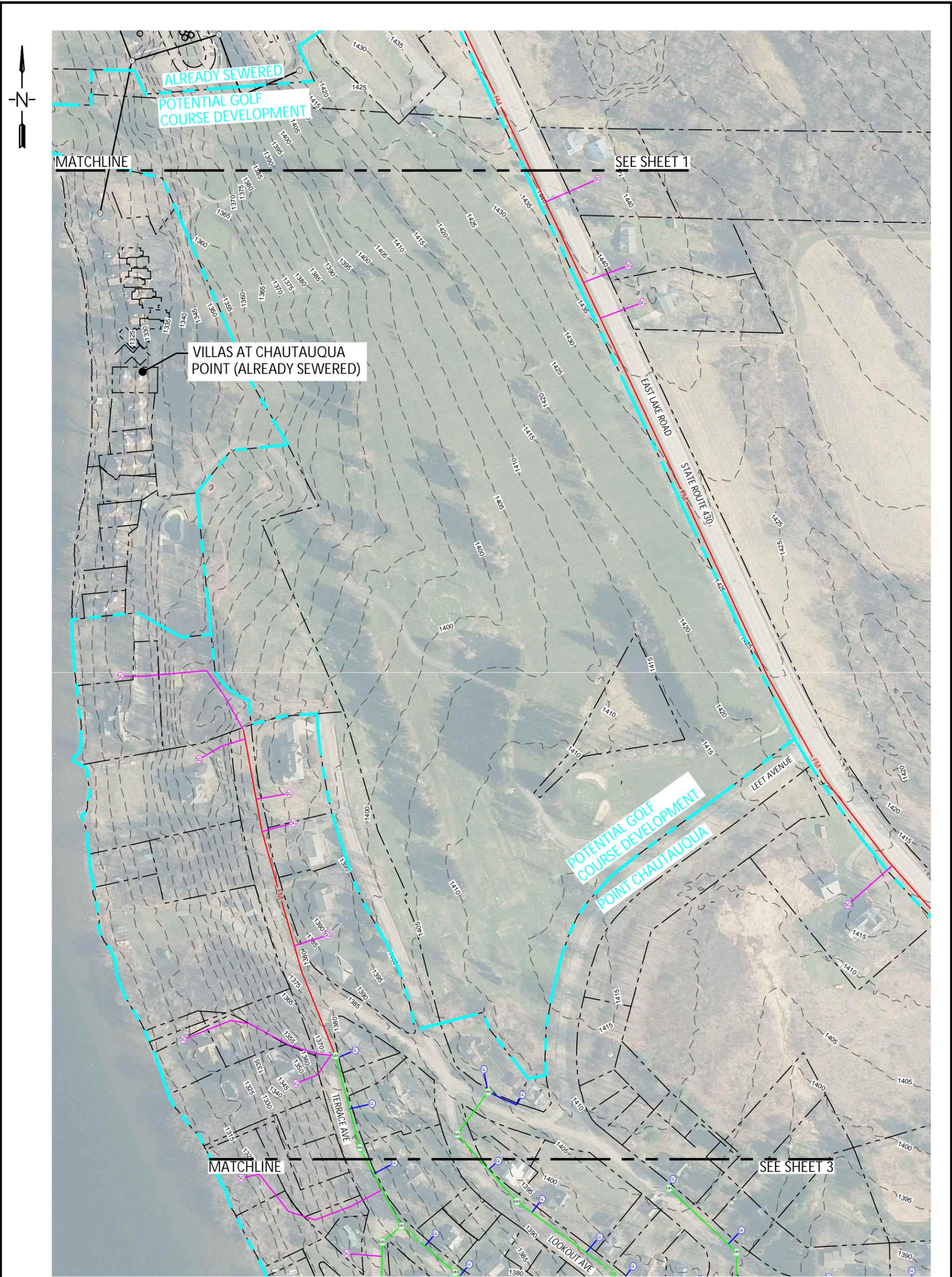
SEE SHEET 2



CHAUTAQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**EXISTING SEWER/NORTH
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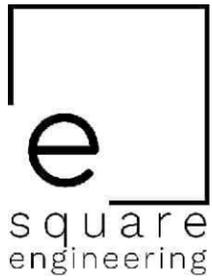
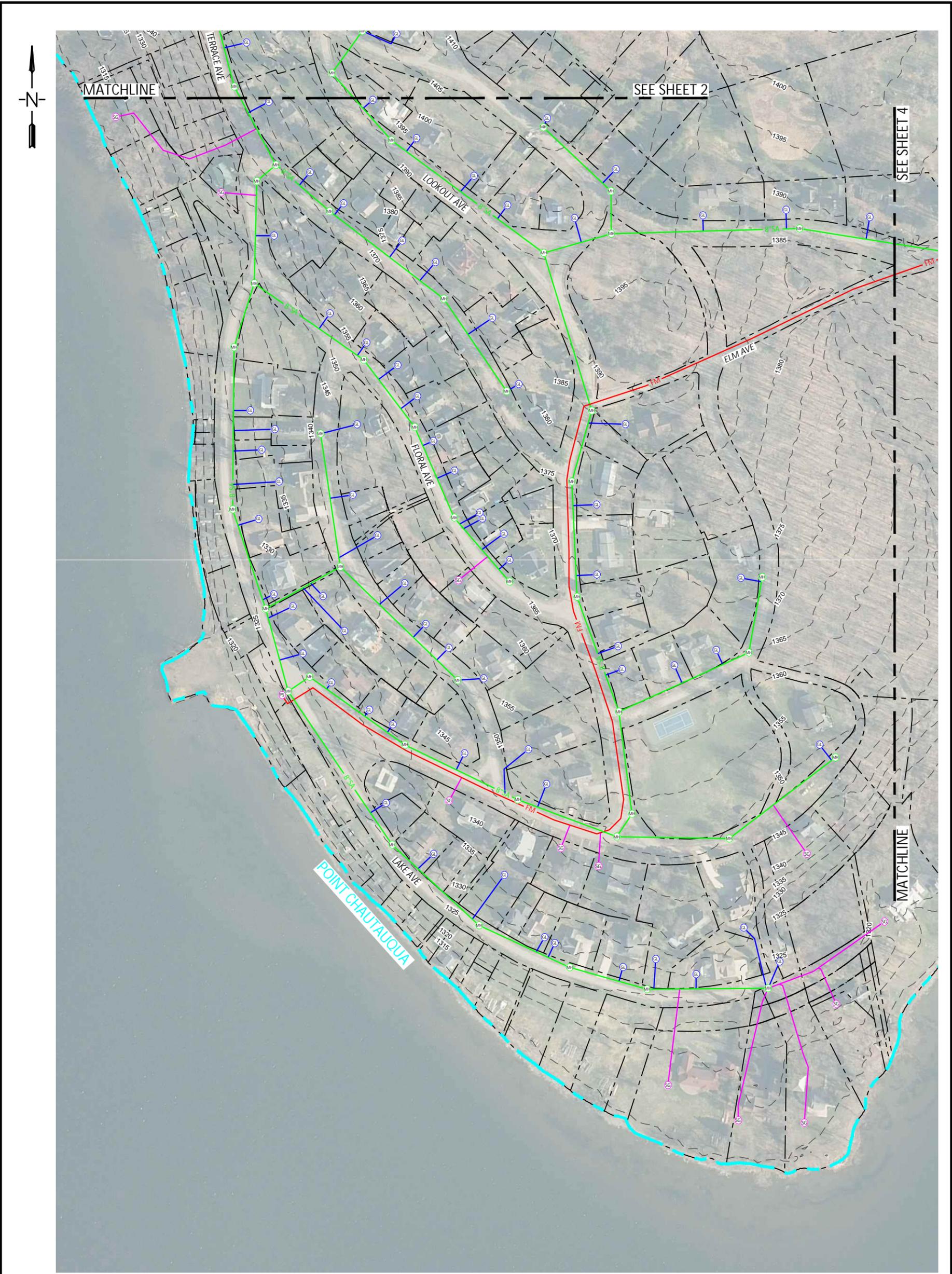
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**POTENTIAL GOLF COURSE
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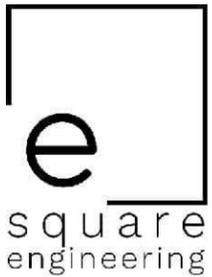
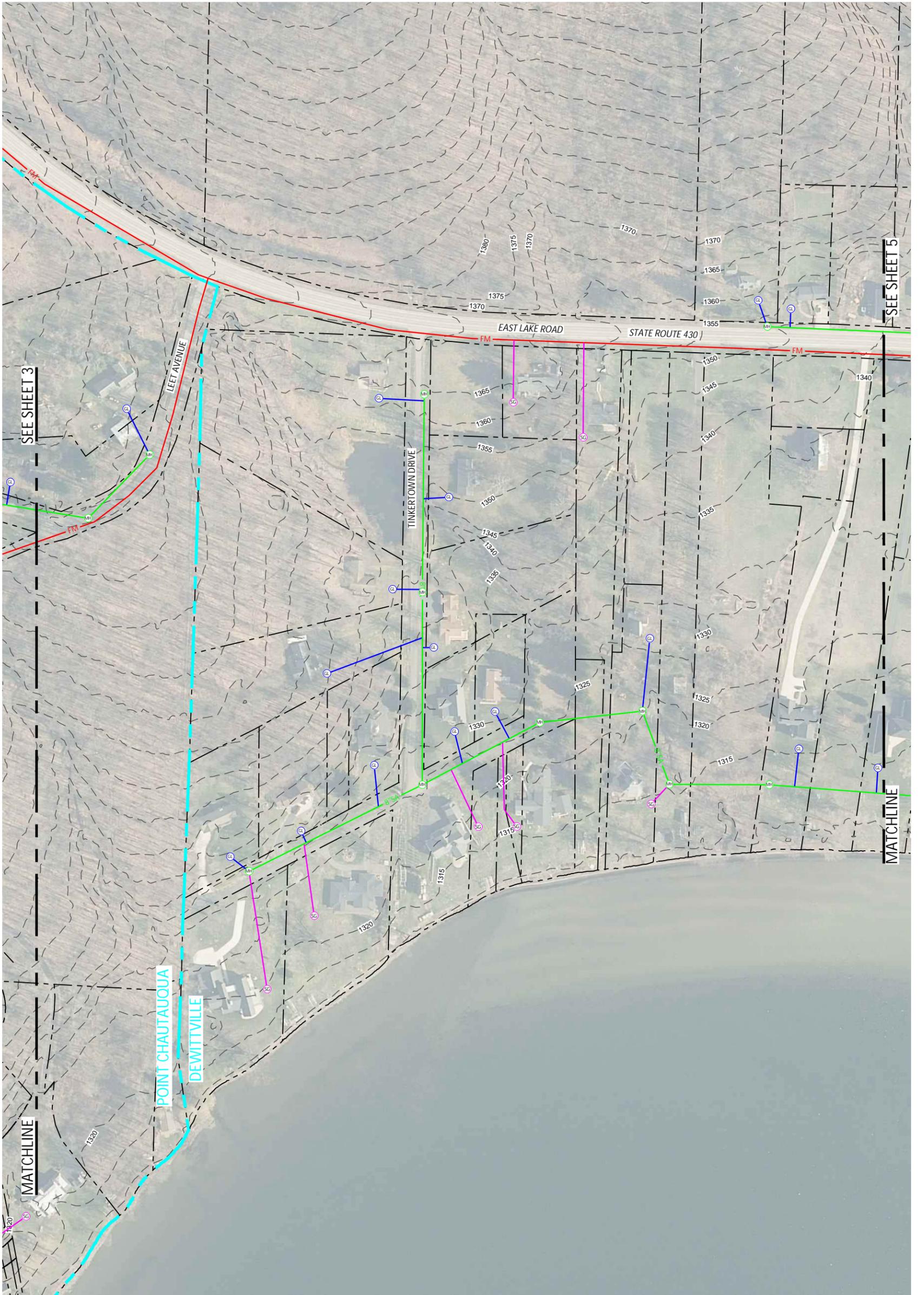
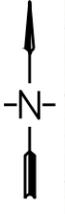
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
POINT CHAUTAUQUA

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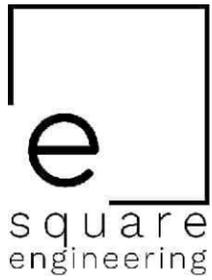
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
DEWITTVILLE

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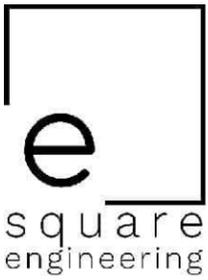
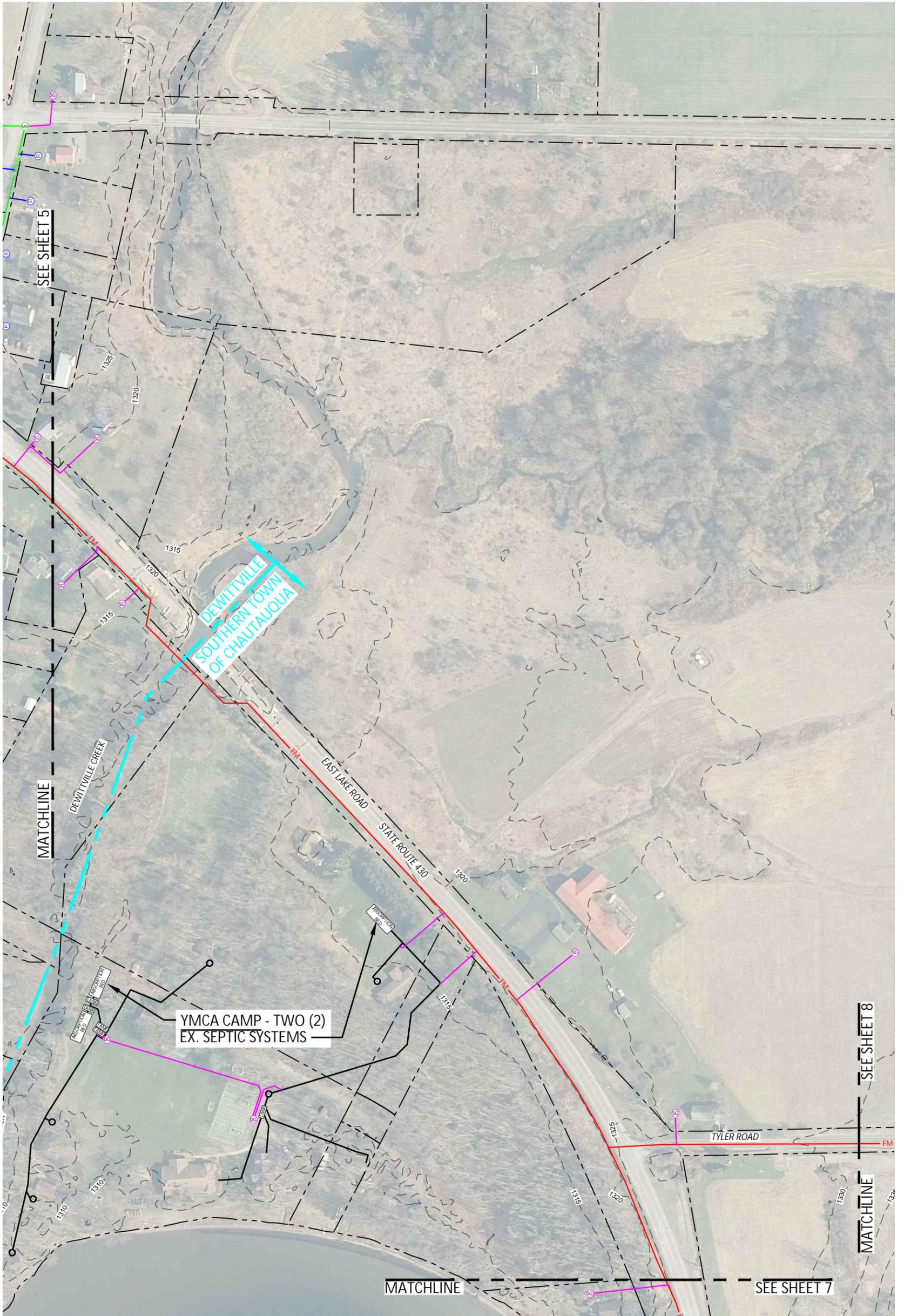
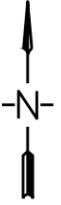
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**CREEK & LAKE CAMPGROUND /
 DEWITTVILLE**

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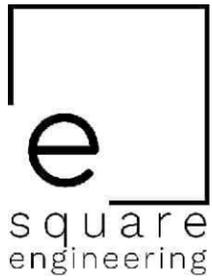
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**YMCA CAMP / SOUTHERN
 TOWN OF CHAUTAUQUA**

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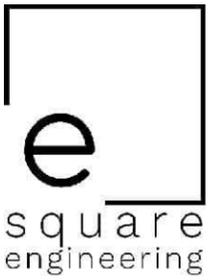
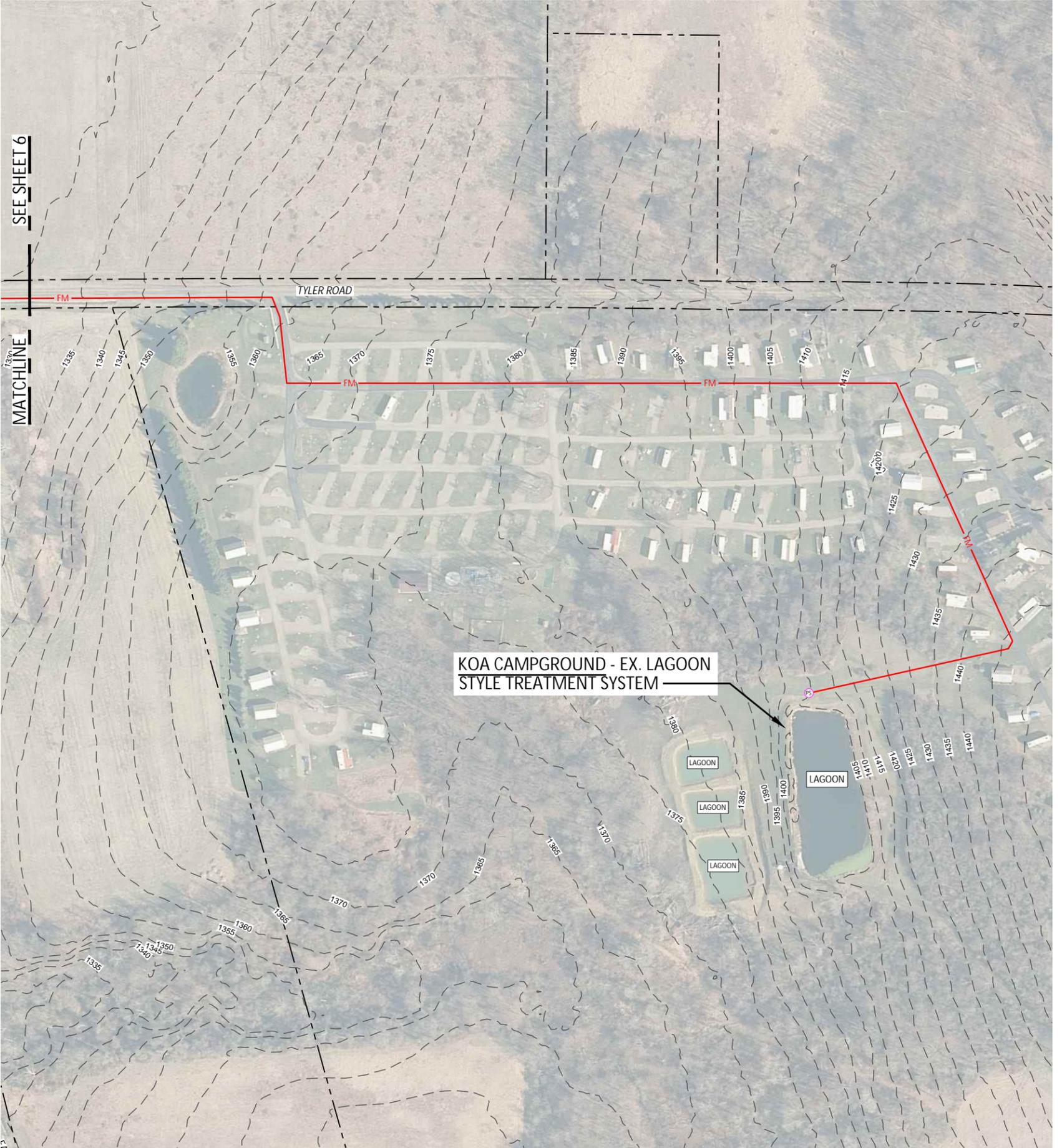
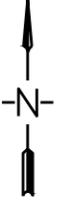


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE

SOUTHERN TOWN OF CHAUTAUQUA

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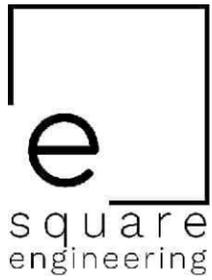
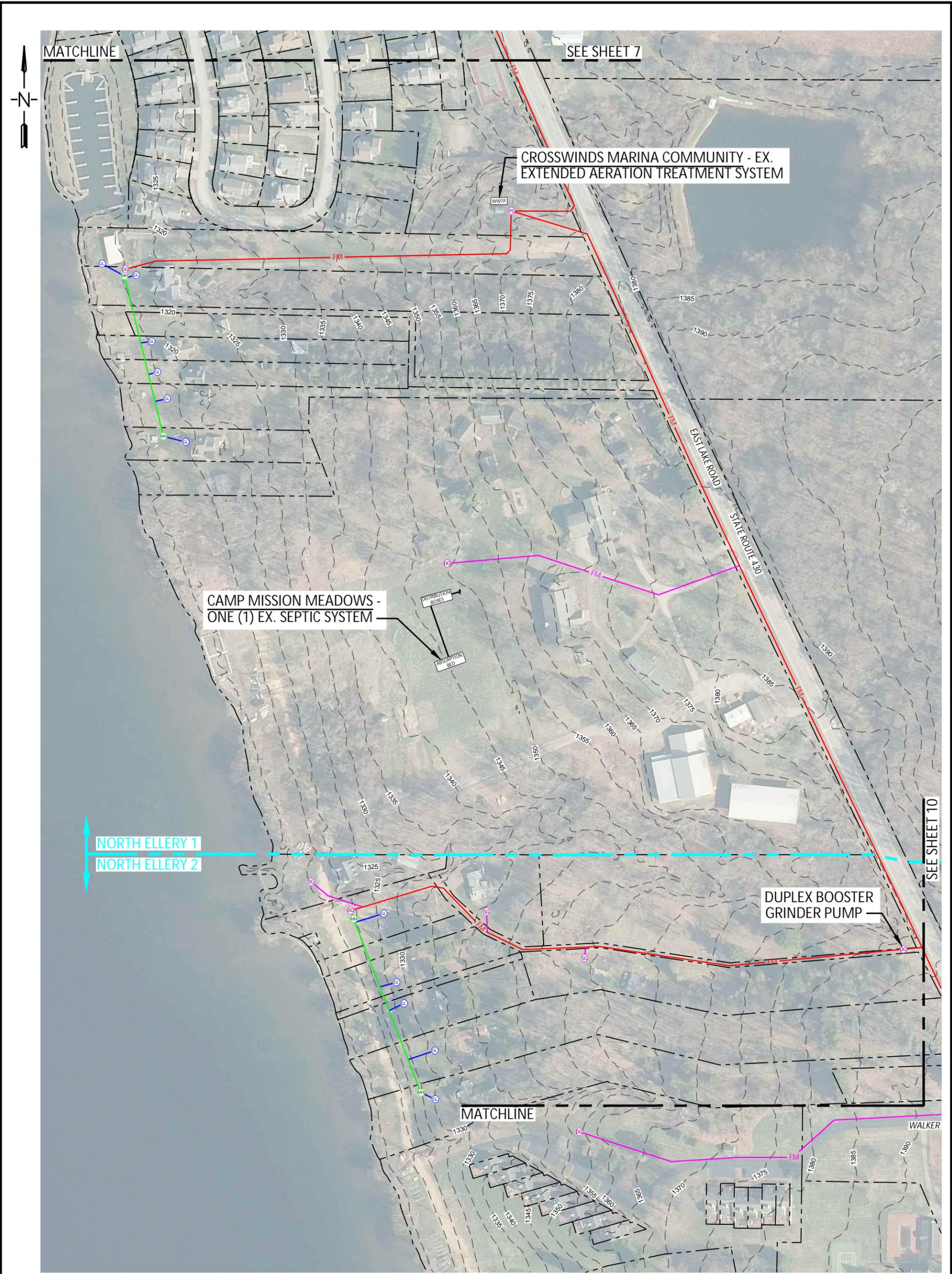
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
KOA CAMPGROUND

Project No: 125.001	Date: NOVEMBER 2024
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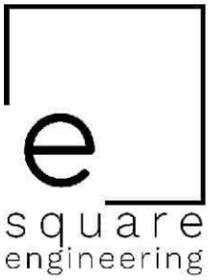
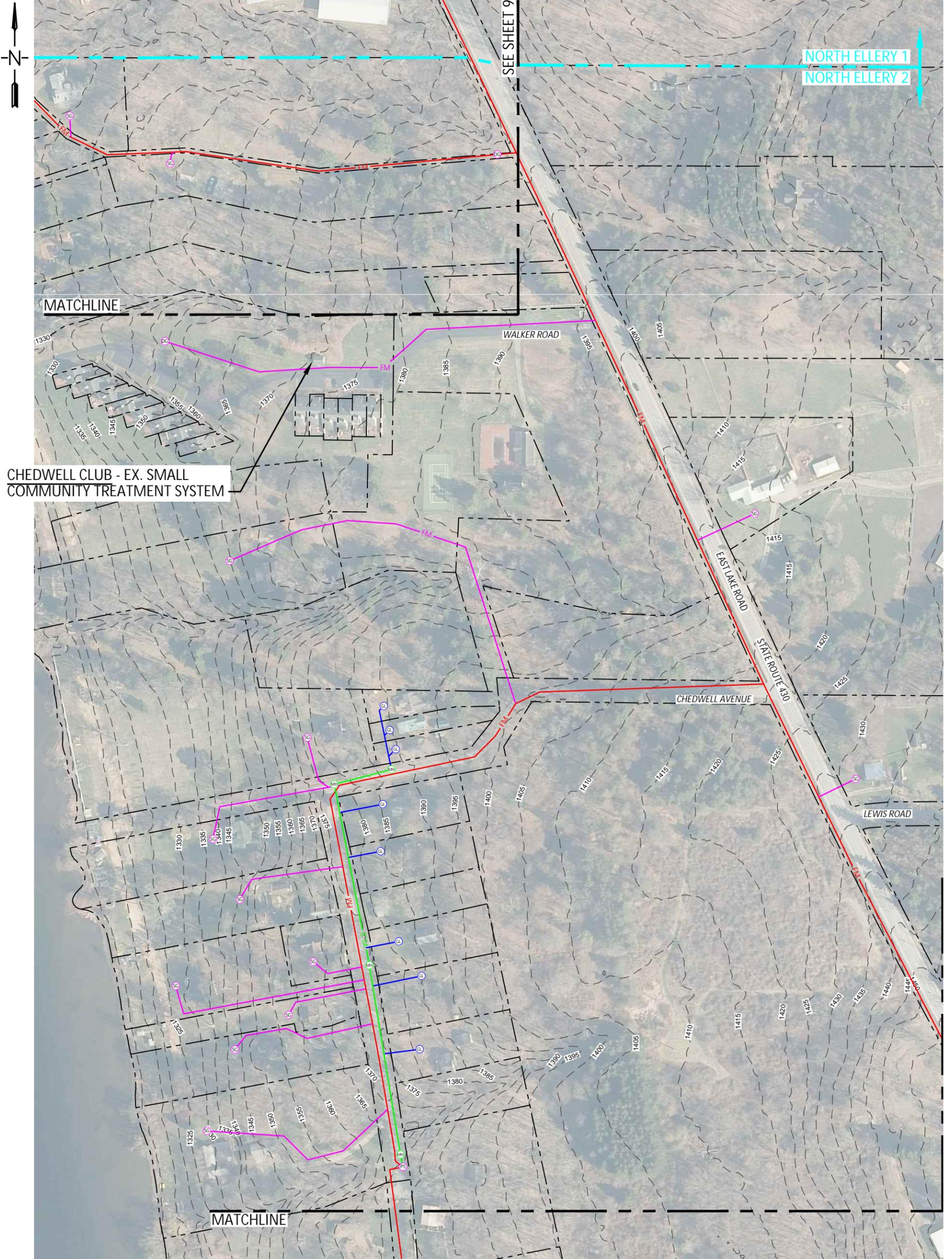


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 1 / CAMP MISSION MEADOWS

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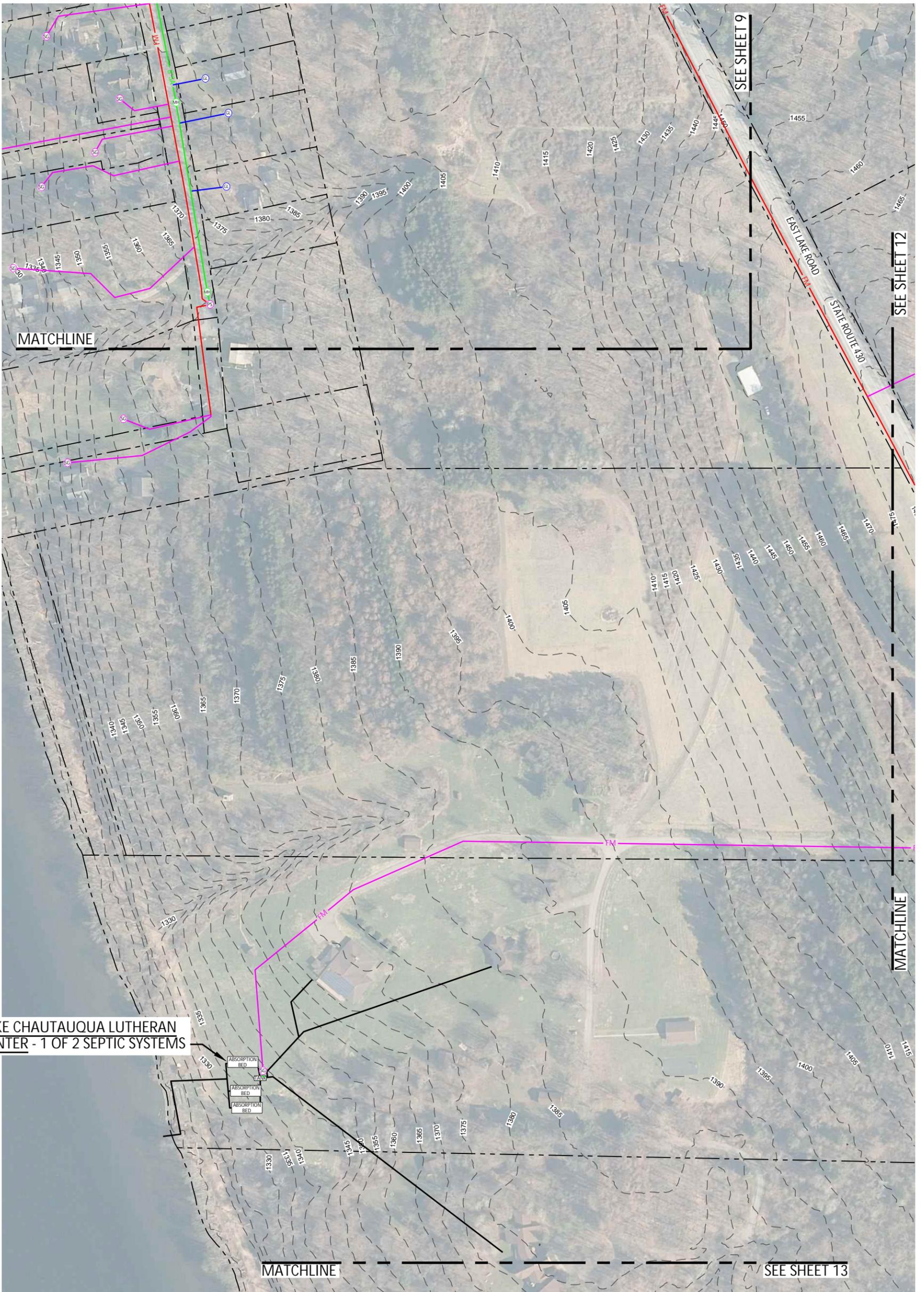
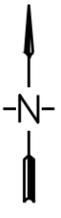


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 2 / CHEDWELL CLUB

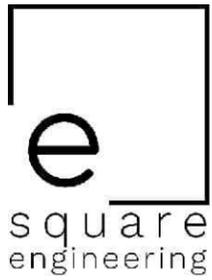
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LAKE CHAUTAUQUA LUTHERAN CENTER - 1 OF 2 SEPTIC SYSTEMS

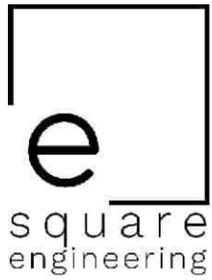
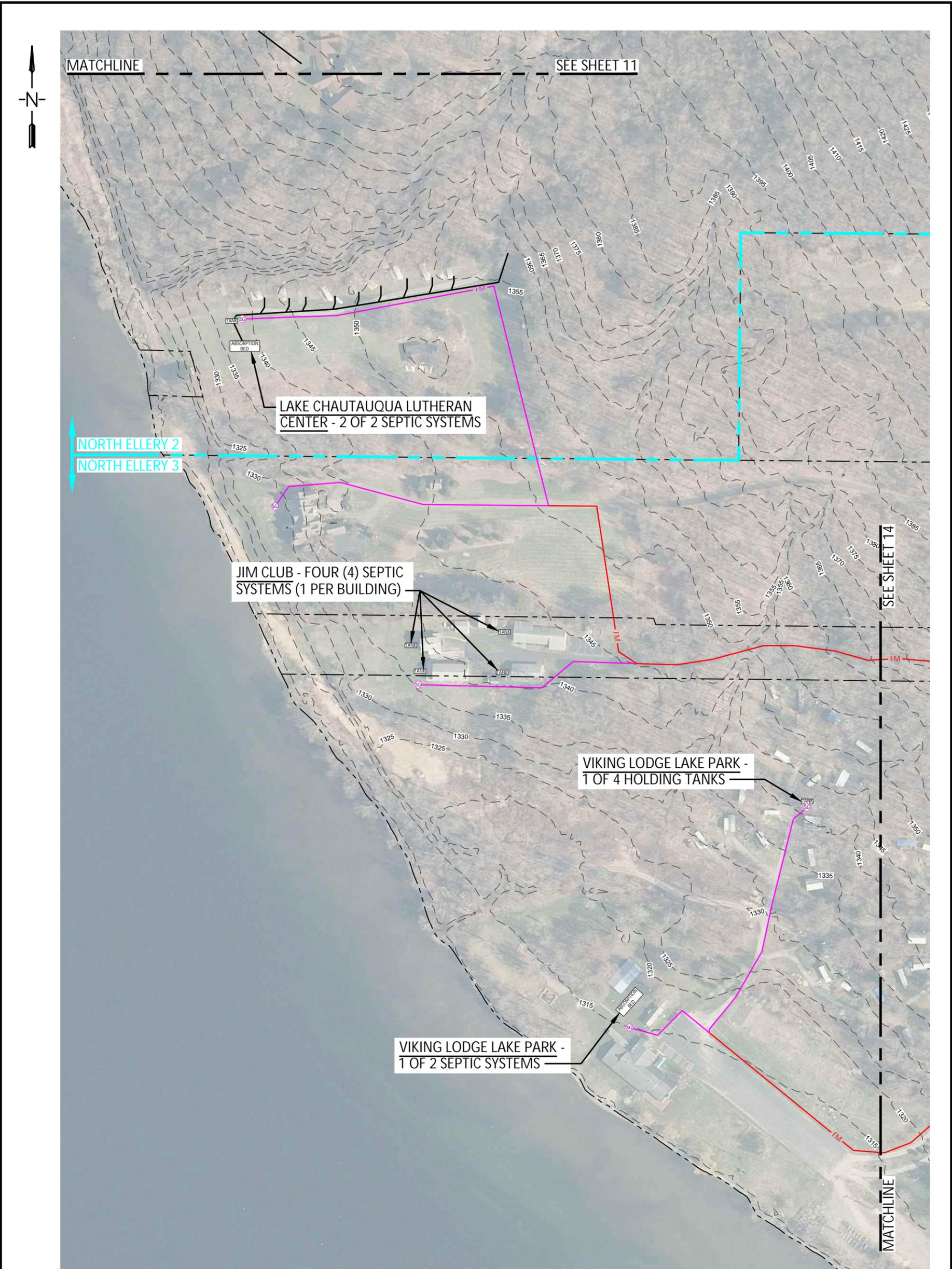
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ABSORPTION BED
ABSORPTION BED



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**NORTH ELLERY 2 /
LUTHERAN CENTER**

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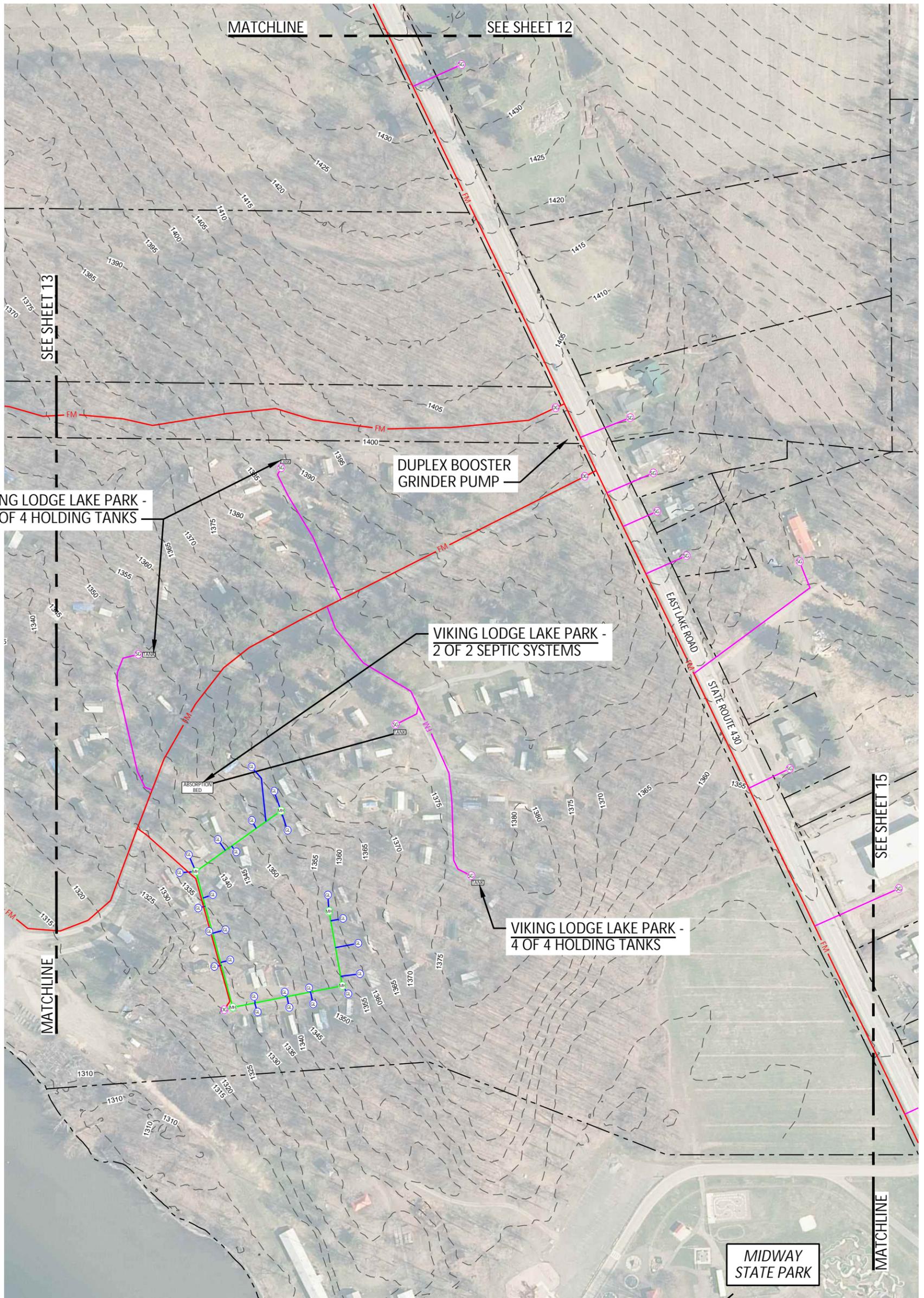
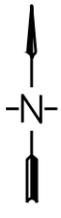
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**NORTH ELLERY 3 / JIM CLUB
 / VIKING LODGE LAKE PARK**

Project No: 125.001	Date: NOVEMBER 2024
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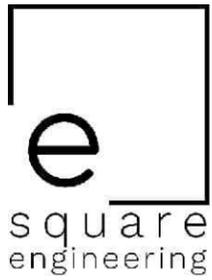
VIKING LODGE LAKE PARK -
2/3 OF 4 HOLDING TANKS

DUPLEX BOOSTER
GRINDER PUMP

VIKING LODGE LAKE PARK -
2 OF 2 SEPTIC SYSTEMS

VIKING LODGE LAKE PARK -
4 OF 4 HOLDING TANKS

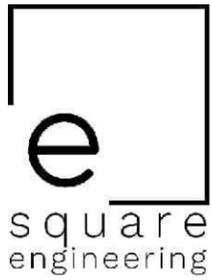
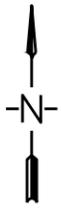
MIDWAY
STATE PARK



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
**NORTH ELLERY 3 /
VIKING LODGE LAKE PARK**

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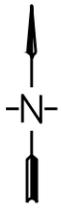
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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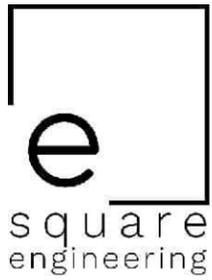


MATCHLINE

SEE SHEET 15

SEE SHEET 17

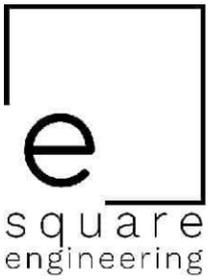
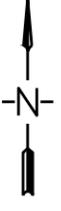
MATCHLINE



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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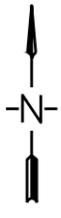
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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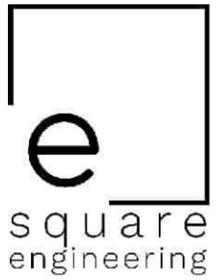


MATCHLINE

SEE SHEET 17

MATCHLINE

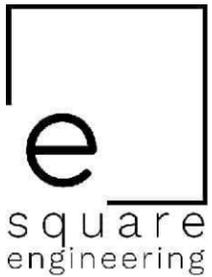
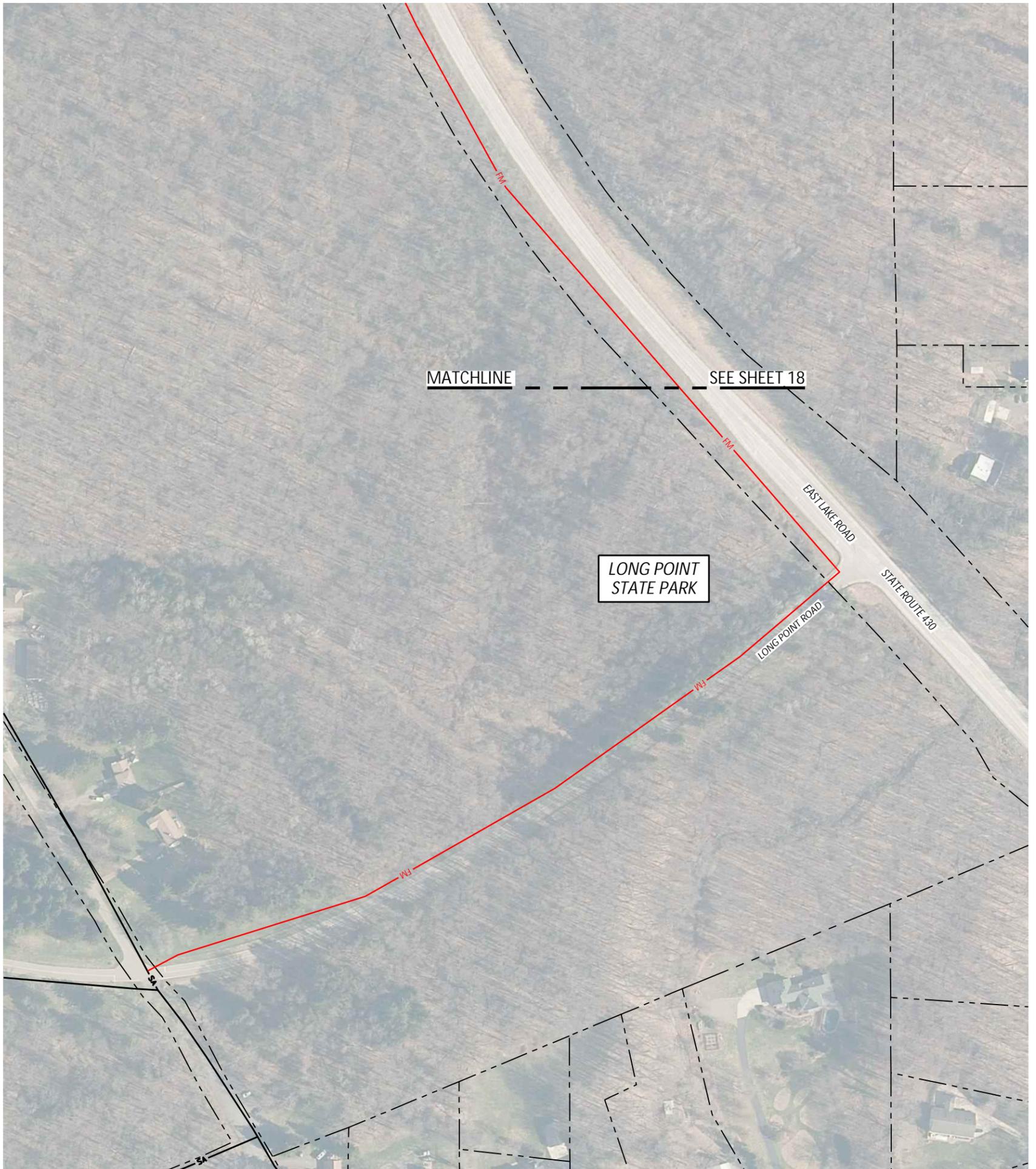
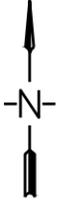
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

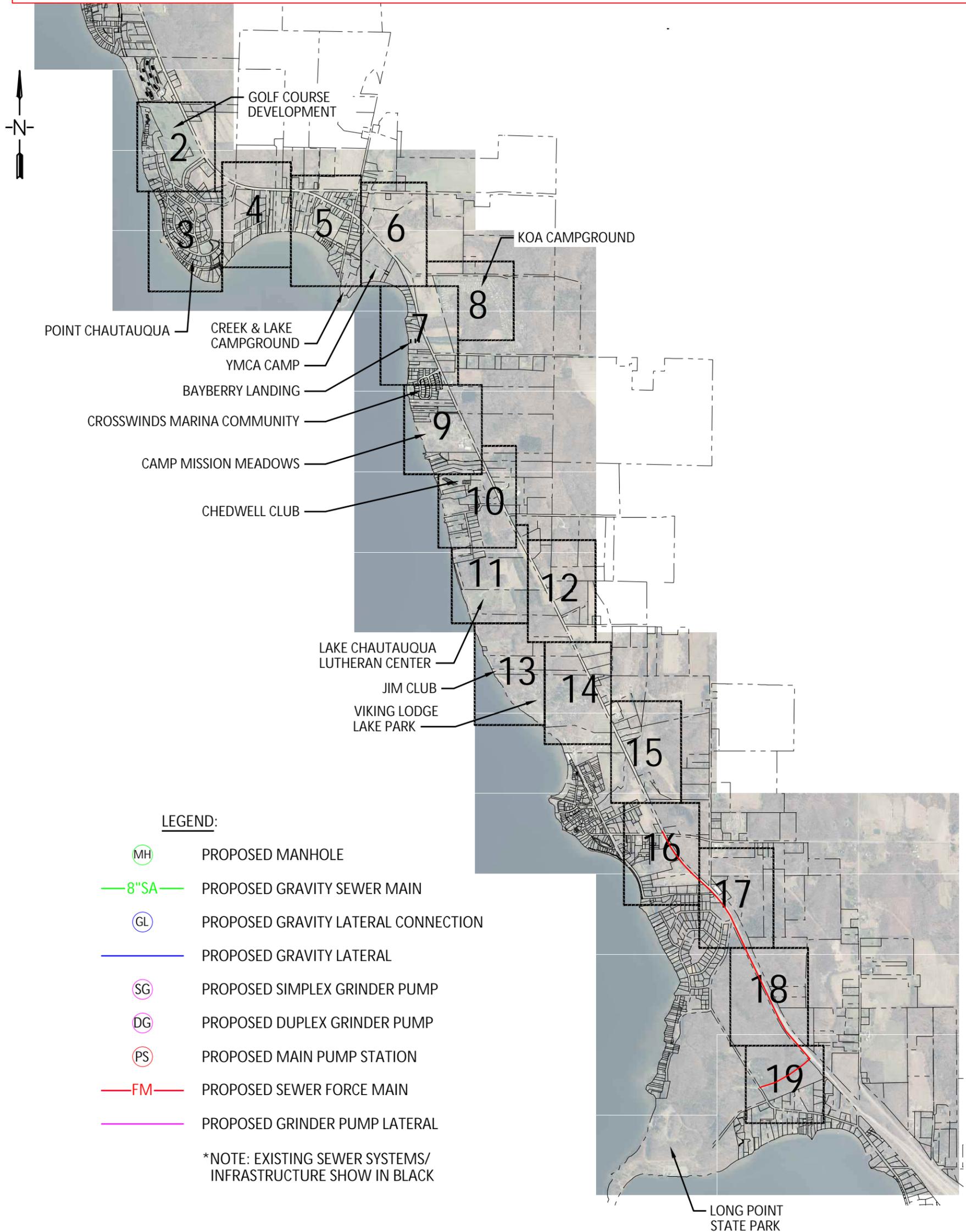
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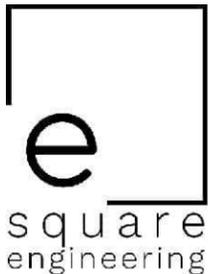
Appendix M

Hybrid Collection System – Option 2 – Preliminary Layout

**COLLECTION SYSTEM ALTERNATIVE NO. 1 - "HYBRID" COLLECTION SYSTEM
 OPTION NO. 2 - CONVEYANCE TO SCCLSD WWTP (WITHOUT GOLF COURSE DEVELOPMENT)
 PRELIMINARY COLLECTION SYSTEM LAYOUT**



Note: Layouts are preliminary and are largely utilized for estimating quantities of piping required. Size and locations of infrastructure subject to change and shall be verified design engineer during final project design.

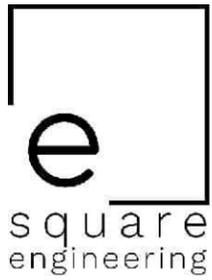
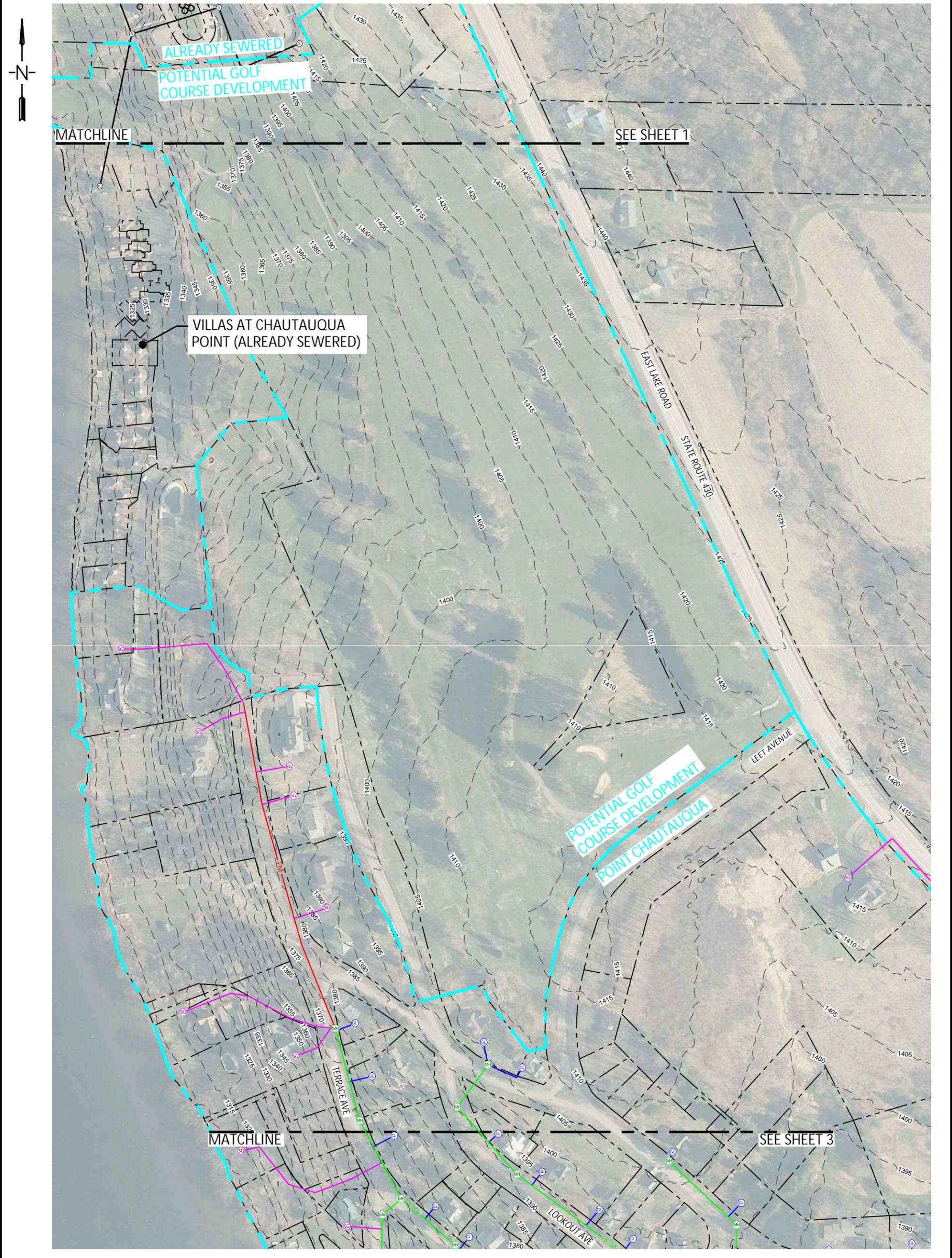


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE

SHEET INDEX

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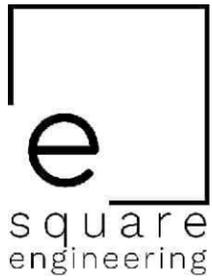
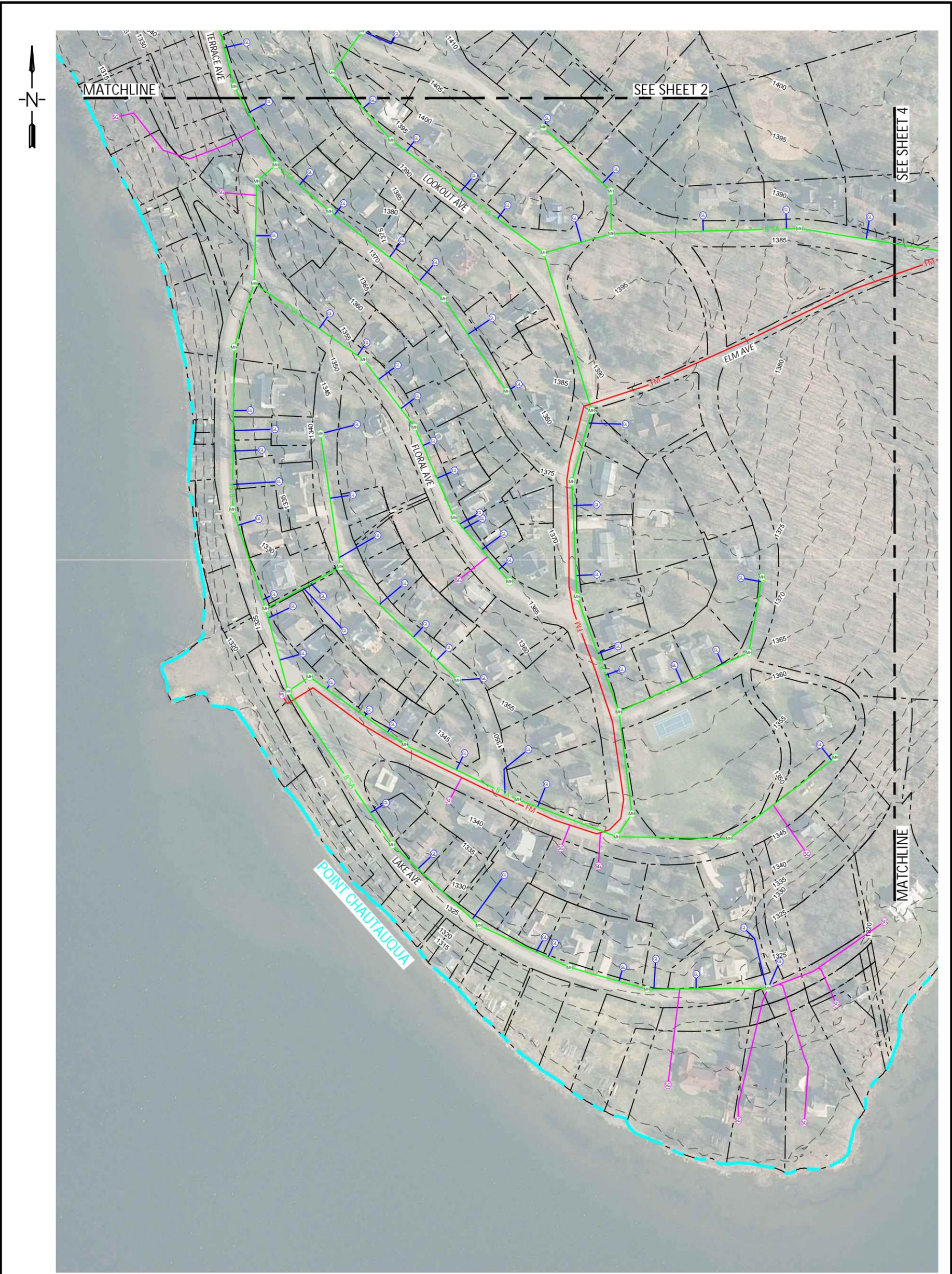
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**POTENTIAL GOLF COURSE
 DEVELOPMENT**

Project No: 125.001	Date: NOVEMBER 2024
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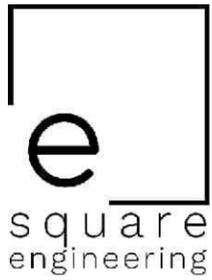
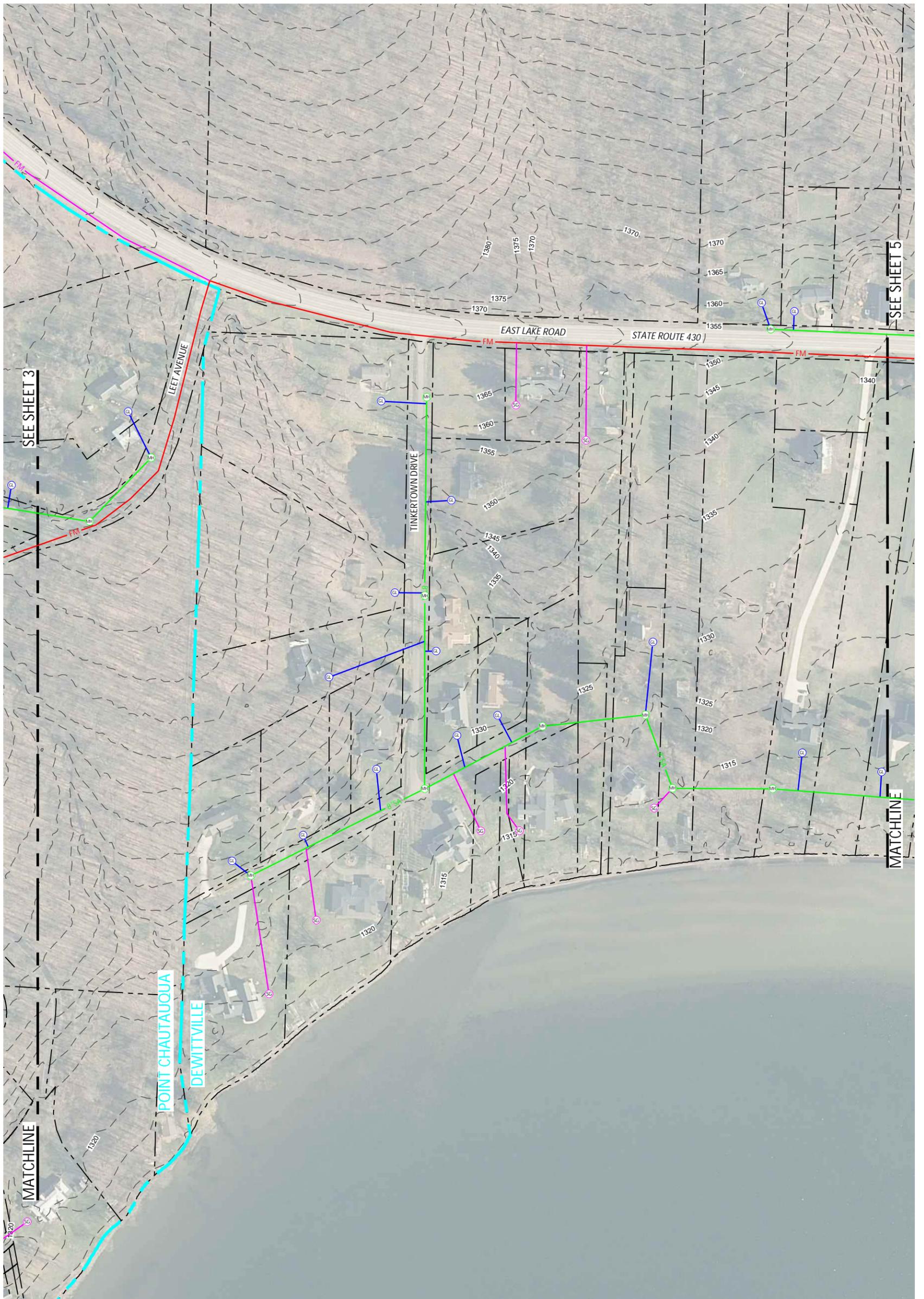
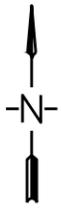
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
POINT CHAUTAUQUA

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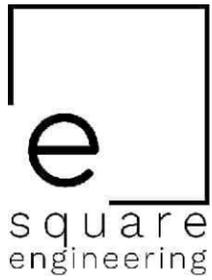
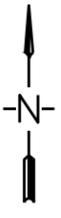
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
DEWITTVILLE

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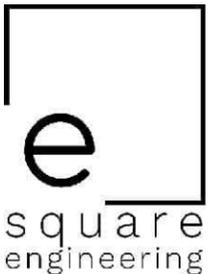
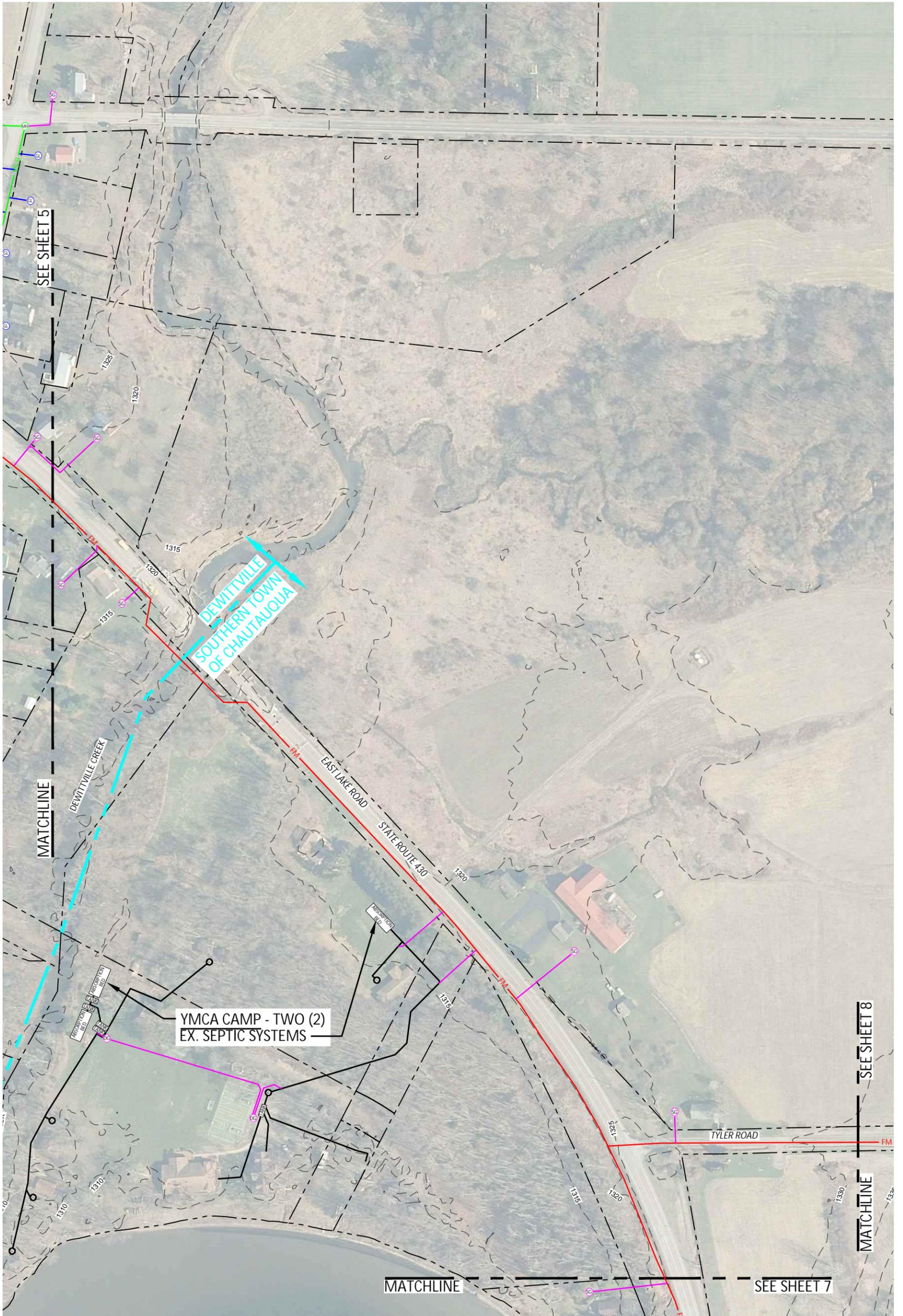
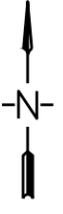
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**CREEK & LAKE CAMPGROUND /
 DEWITTVILLE**

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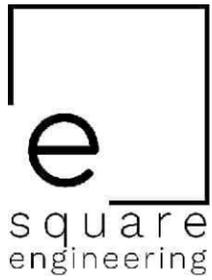
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**YMCA CAMP / SOUTHERN
 TOWN OF CHAUTAUQUA**

Project No: 125.001	Date: NOVEMBER 2024
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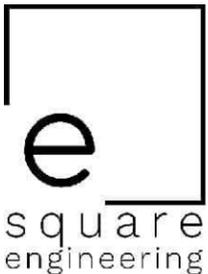
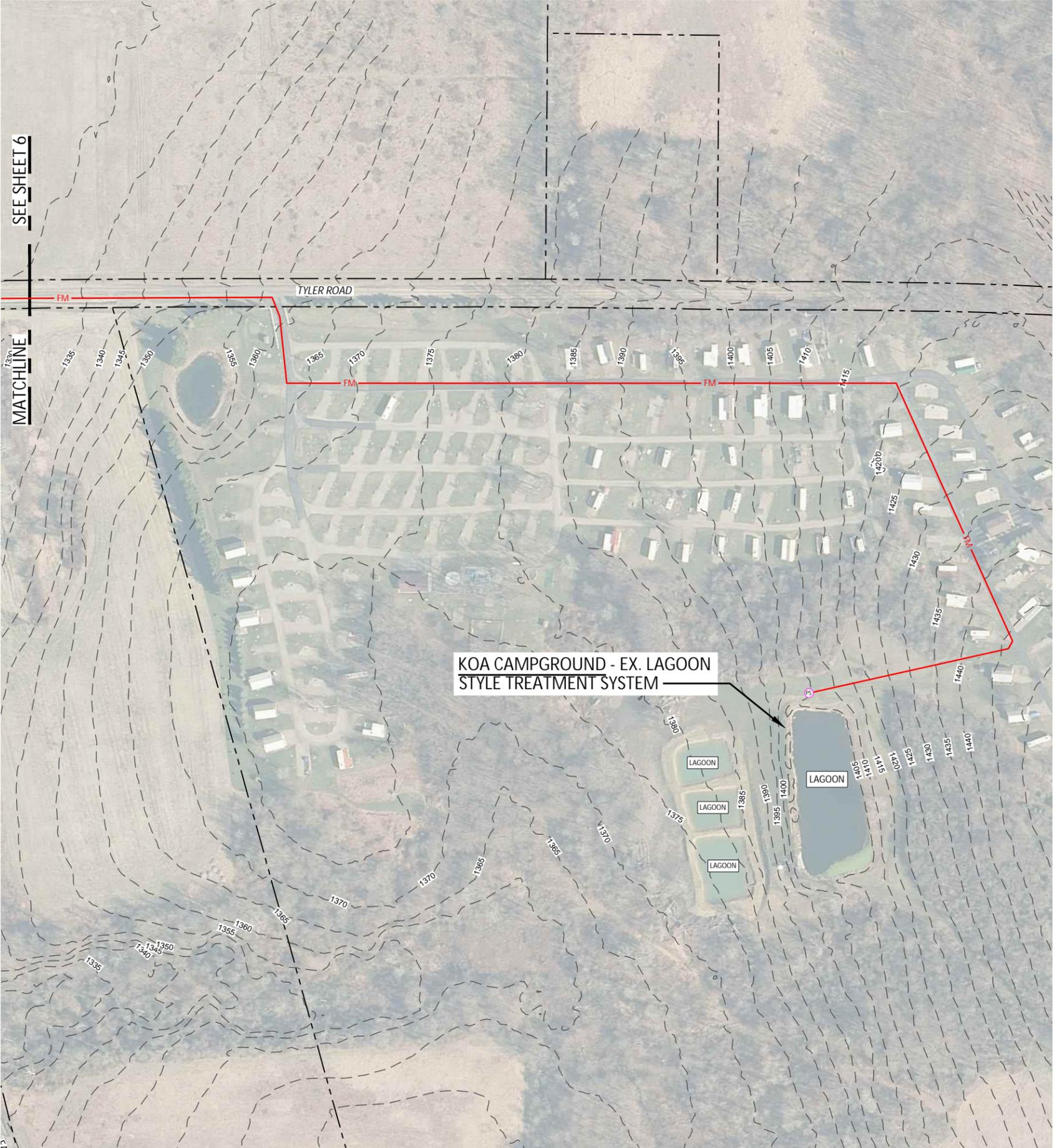
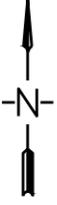
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**SOUTHERN TOWN OF
 CHAUTAUQUA**

Project No: 125.001	Date: NOVEMBER 2024
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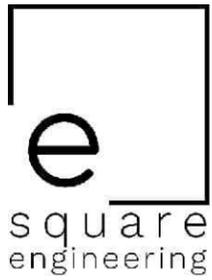
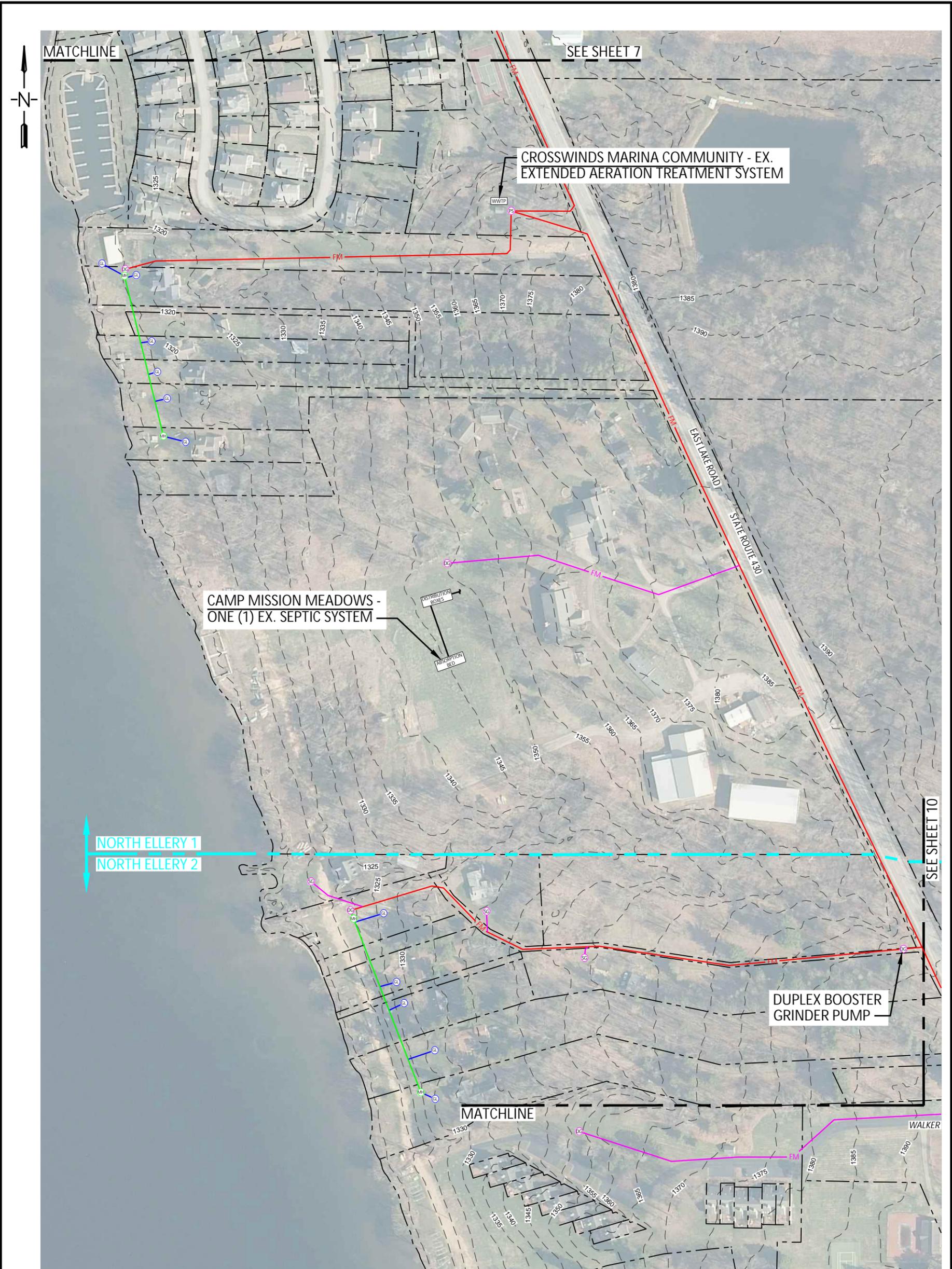
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
KOA CAMPGROUND

Project No: 125.001	Date: NOVEMBER 2024
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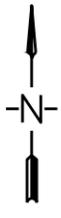
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 1 /
 CAMP MISSION MEADOWS**

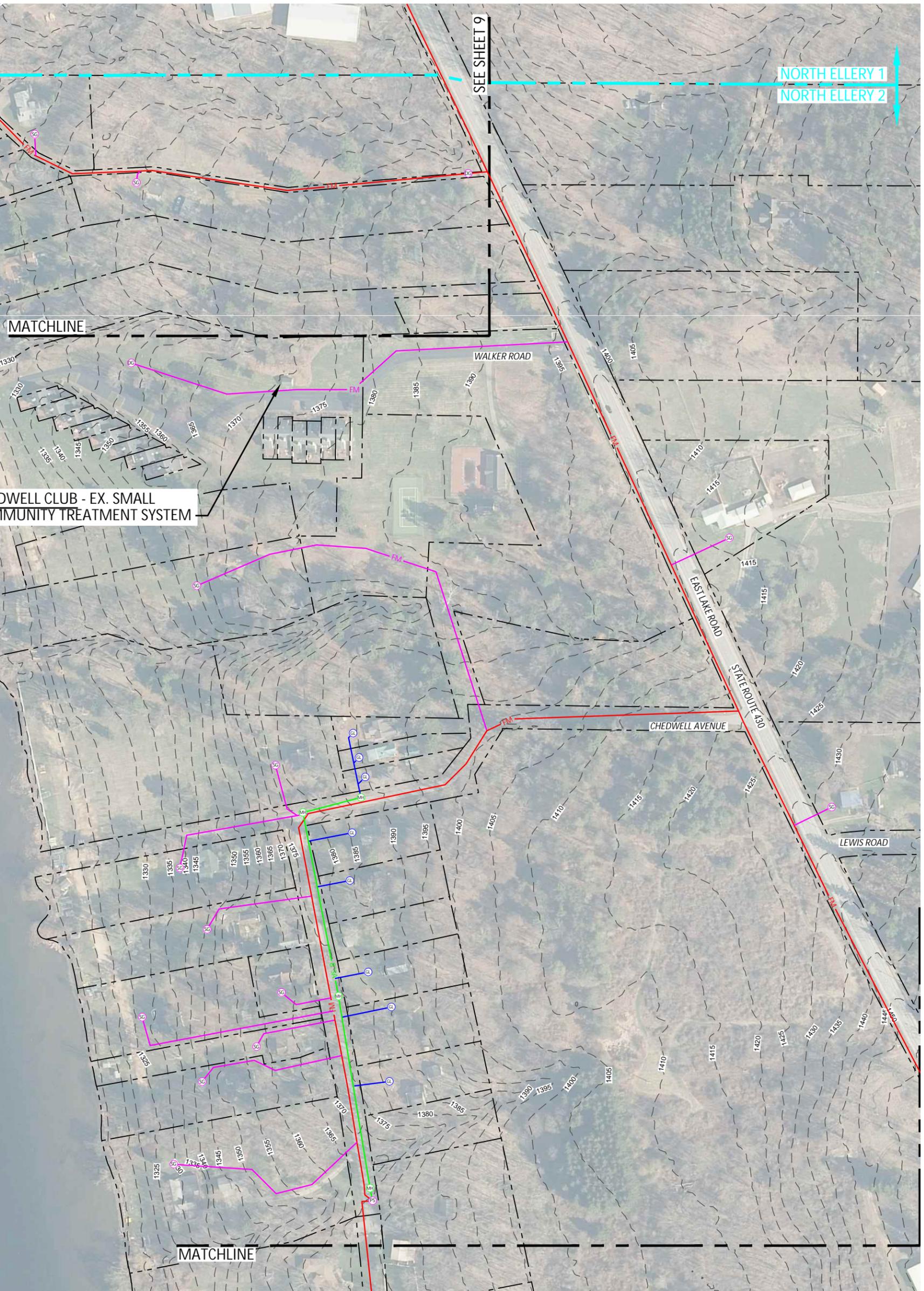
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NORTH ELLERY 1
NORTH ELLERY 2

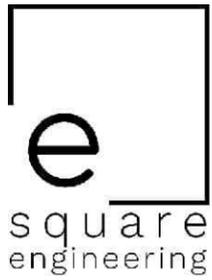
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CHEDWELL CLUB - EX. SMALL
COMMUNITY TREATMENT SYSTEM

MATCHLINE

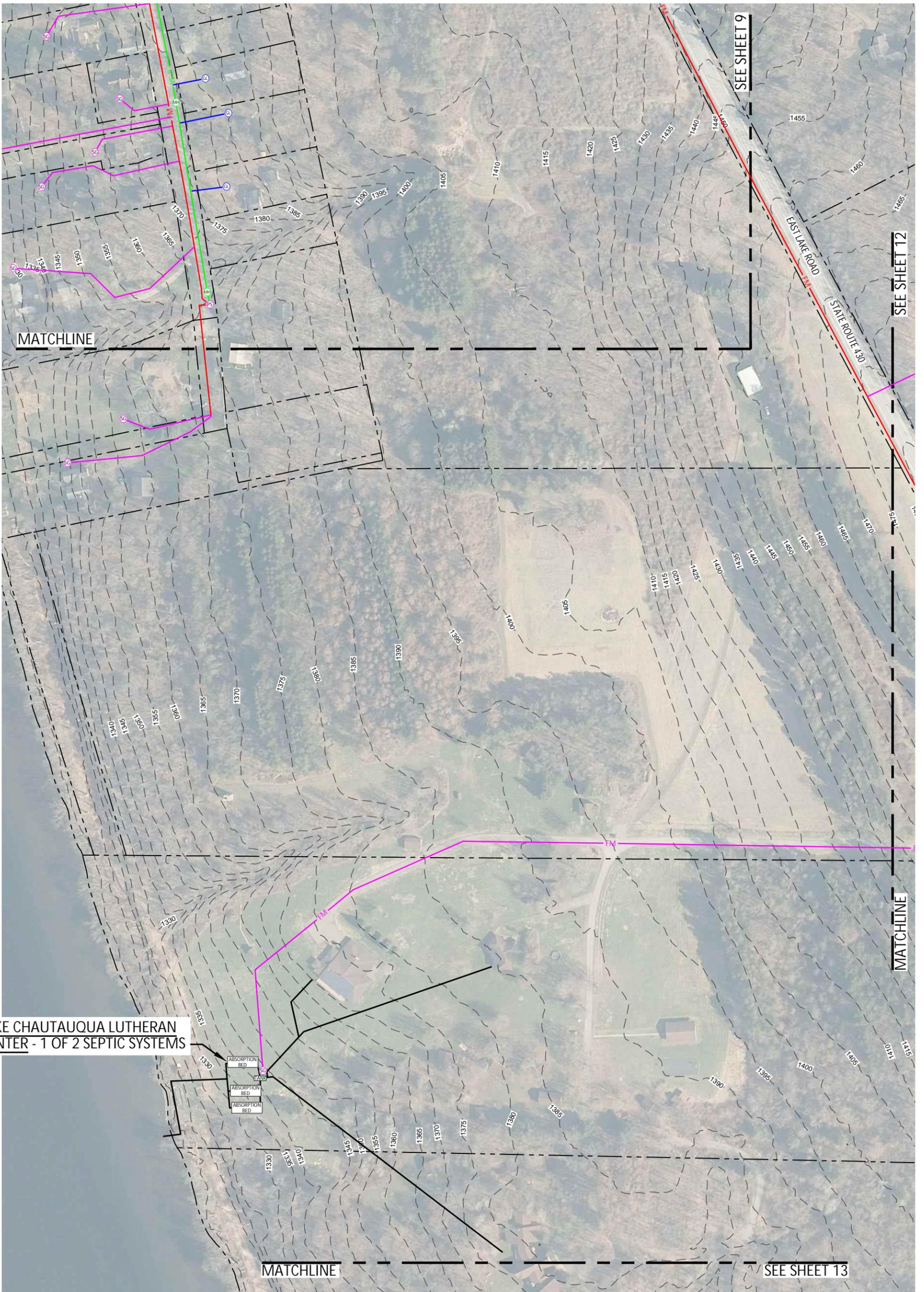
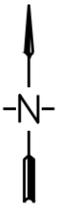
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 2 /
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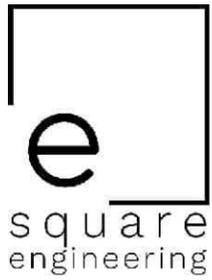
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LAKE CHAUTAUQUA LUTHERAN CENTER - 1 OF 2 SEPTIC SYSTEMS

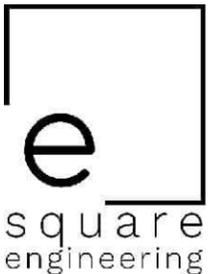
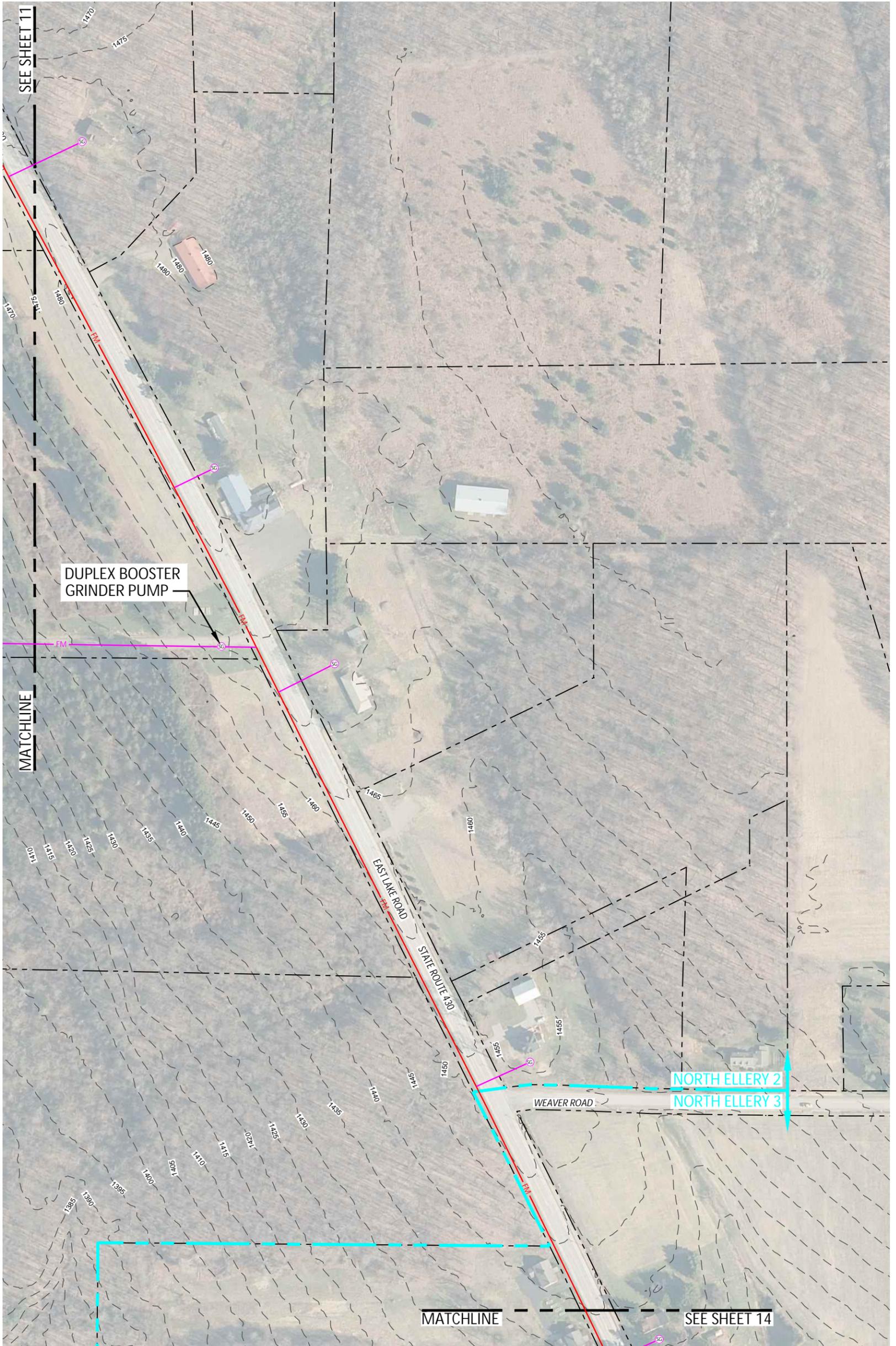
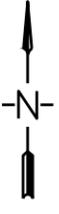
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 2 /
LUTHERAN CENTER**

Project No: 125.001	Date: NOVEMBER 2024
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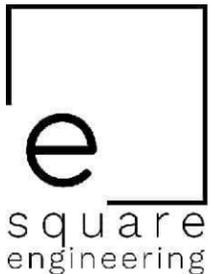
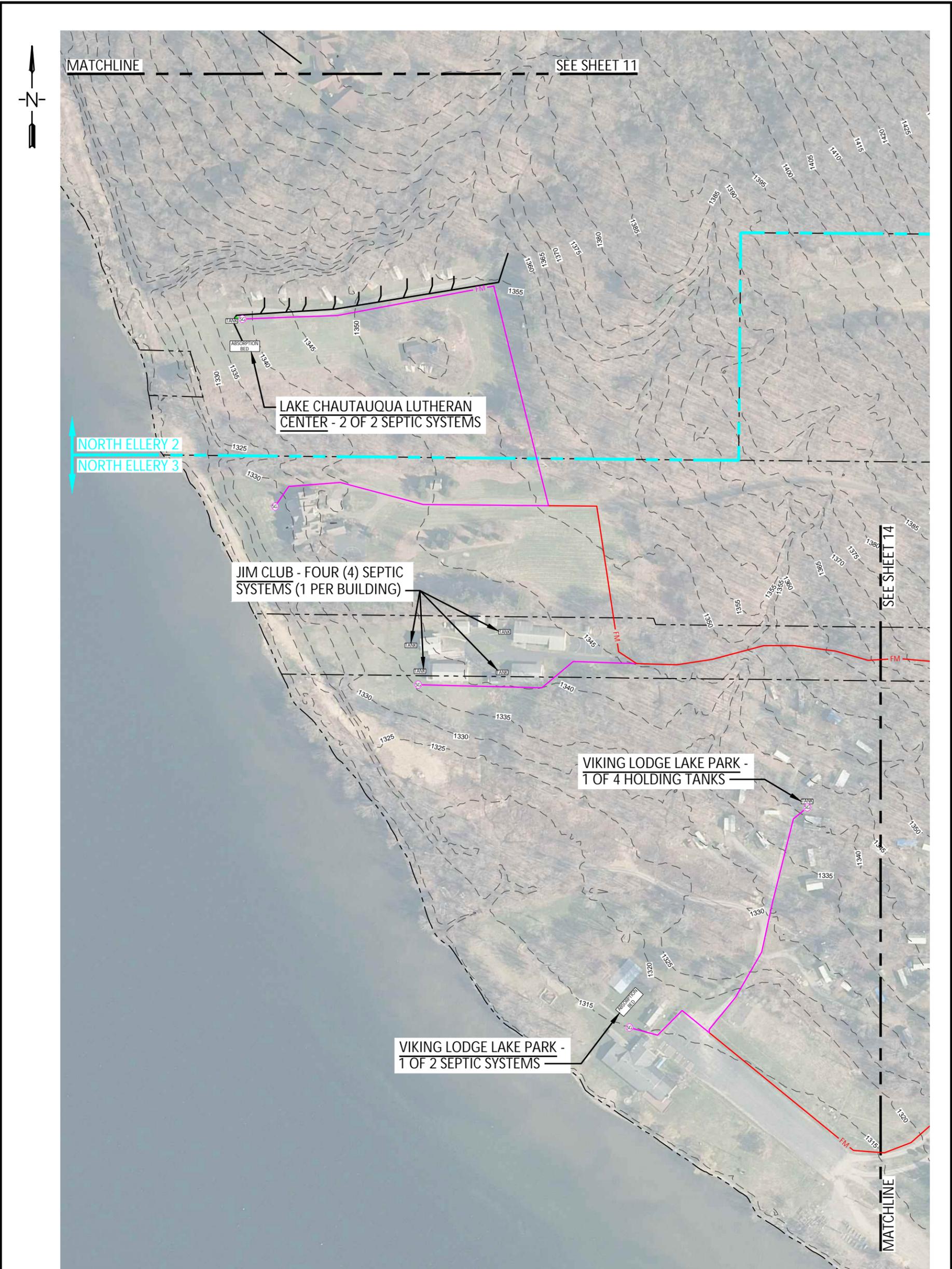
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 2

Project No: 125.001	Date: NOVEMBER 2024
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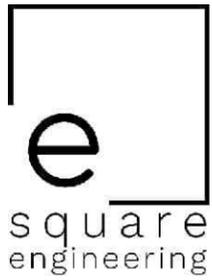
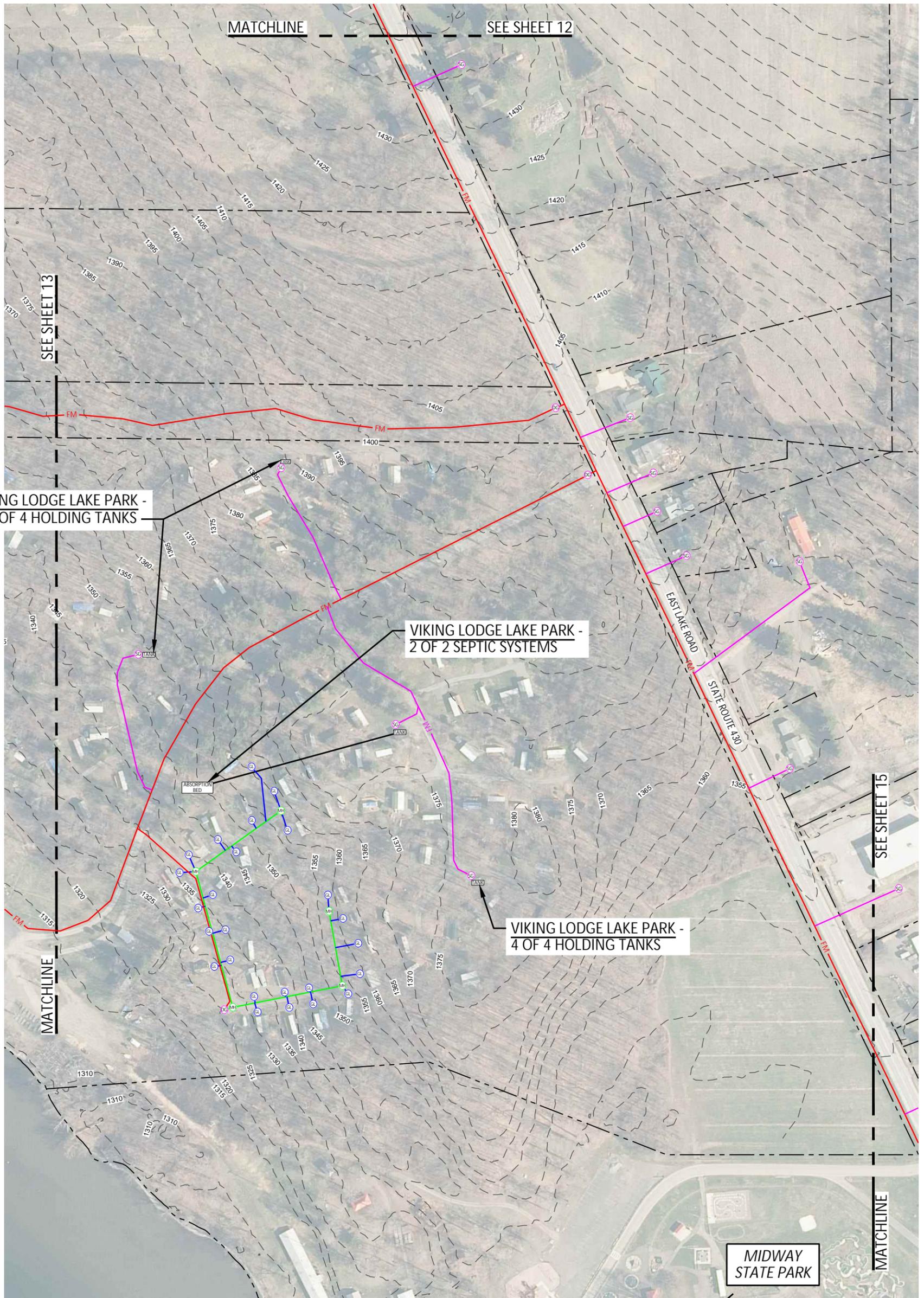
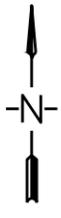
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 3 / JIM CLUB
 / VIKING LODGE LAKE PARK**

Project No: 125.001	Date: NOVEMBER 2024
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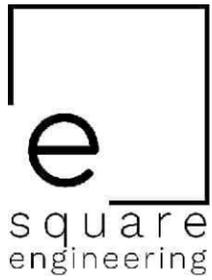
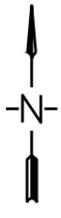
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 3 /
 VIKING LODGE LAKE PARK**

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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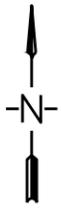
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
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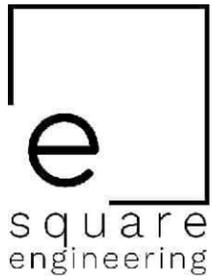


MATCHLINE

SEE SHEET 15

SEE SHEET 17

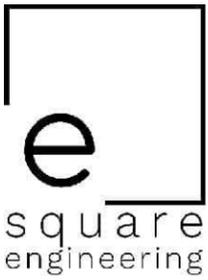
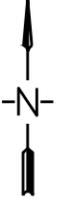
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
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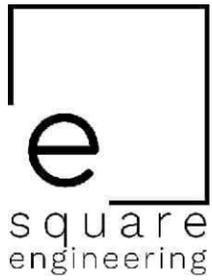
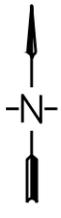
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
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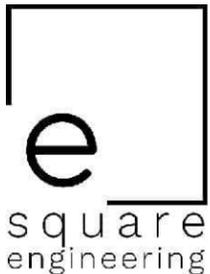
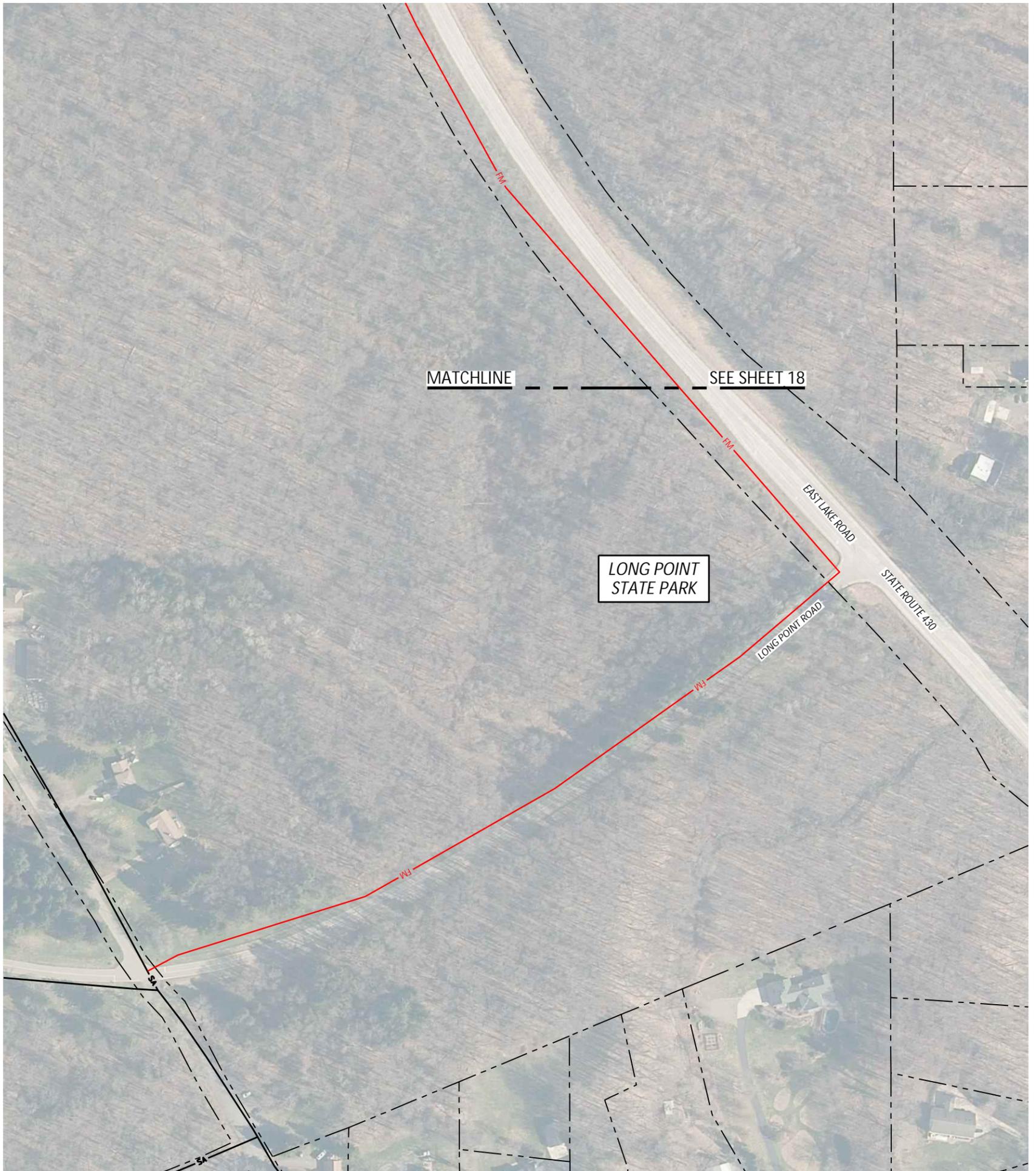
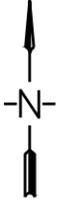
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 "HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
Checked by: MJZ	Set: PRELIMINARY

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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
"HYBRID" COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
Checked by: MJZ	Set: PRELIMINARY

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Appendix N

Hybrid Collection System – Pump Station Calculations

Collection System Alternative No. 1 - "Hybrid" Collection System

**Option No. 1 - All flow to SCCLSD WWTP
with the Potential Golf Course Development**

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Service Area Flows

Point Chautauqua	Est. Avg. Day Flow:	23,400	gpd	=	16	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	93,600	gpd	=	65	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	100	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1324.00	ft	High Level Alarm =	1316.50	ft
Bottom of Wet Well =	1312.00	ft	Lag Pump On Elevation =	1316.25	ft
Inlet Invert Elevation =	1319.00	ft	Lead Pump On Elevation =	1316.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1314.00	ft
Inside Diameter of WW =	8.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 100.53 ft³ = 752 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	46.28	min.	Wet Well Fill Time:	11.57	min.
Wet Well Empty Time:	8.74	min.	Wet Well Empty Time:	12.41	min.
Total Pump Starts / Hour:	1.09		Total Pump Starts / Hour:	2.50	
Starts / Hour / Pump:	0.55		Starts / Hour / Pump:	1.25	
Est. Daily Pump Run Hours	3.81	hrs	Est. Daily Pump Run Hours	12.42	hrs

Storage and Response Times

Storage Volume Above High Alarm:	125.66	ft ³	=	940.03	gal.
ADF Response time for Double Pump/Power Failure:	57.85	min.			
PHF Response time for Double Pump/Power Failure:	14.46	min.			

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

8" Force Main - Part 2 (Point Chautauqua PS Connection to Dewittville PS Connection)

Golf Course Pump Station (Assumed):	150	gpm
Total No. of Grinder Pumps:	4	
Dewittville No. of Grinder Pumps Running at Once:	3	
Downstream Flow (11 gpm per pump):	33	gpm

Min. Force Main Flow =	100	gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	146	gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	283	gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

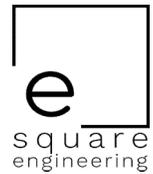
Project: 125.001

Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

8" Force Main - Part 1 (Dewittville PS Connection to Crosswinds Marina PS)

Dewittville PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	25
	No. of Grinder Pumps Running at Once:	5
	Downstream Flow (11 gpm per pump):	55 gpm

Min. Force Main Flow =	100 gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	203 gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	510 gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,314	ft.
End Elevation:	1,364	ft.
Static Head:	50.00	ft.

4" Force Main Dynamic Head

Nominal Dia.:	4	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	3.876	in.
Length:	3,100	ft.
C-Value:	130	

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
25	2.1	0.7
50	7.6	1.4
75	16.0	2.0
100	27.3	2.7
120	38.3	3.3

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head - Part 1

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	3,050	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
50	0.3	0.4
100	1.2	0.8
146	2.5	1.1
200	4.4	1.5
225	5.5	1.7
258	7.1	2.0

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

8" Force Main Dynamic Head - Part 2

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	5,450	ft.
C-Value:	130	

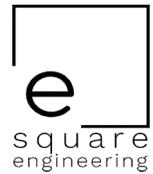
Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	2.2	0.8
146	4.4	1.1
300	16.8	2.3
400	28.6	3.1
500	43.2	3.8
510	44.8	3.9

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Headloss Calculations - High Point

Static Head

Start Elevation: 1,314 ft.
 End Elevation: 1,379 ft.
 Static Head: 65.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,100 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
25	2.1	0.7
50	7.6	1.4
75	16.0	2.0
100	27.3	2.7
125	41.3	3.4

Min./Avg./Peak Force Main Flow

Pump Design Data

Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
81 feet	84 feet	129 feet	92 feet

Preliminary Design Point Selection: 100 GPM @ 129 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Dewittville Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Dewittville Pump Station - Preliminary Calculations

Service Area Flows

Dewittville	Est. Avg. Day Flow:	26,300 gpd	=	18 gpm
	Peaking Factor:	4		
	Peak Flow Conditions:	105,200 gpd	=	73 gpm

Pump Station Design Flow

Nominal Dia.:	4 in.	Minimum Pumping Rate:	74 gpm
Pipe Type:	HDPE	Selected Pumping Rate:	100 gpm
Pipe Standard:	DIPS		
Pipe Class:	DR11		
Actual ID:	3.876 in.		

Wet Well Sizing

Wet Well Rim Elevation =	1312.00 ft	High Level Alarm =	1304.50 ft
Bottom of Wet Well =	1300.00 ft	Lag Pump On Elevation =	1304.25 ft
Inlet Invert Elevation =	1307.00 ft	Lead Pump On Elevation =	1304.00 ft
Wet Well Depth =	12.00 ft	Pump Off Elevation =	1302.00 ft
Inside Diameter of WW =	8.00 ft		

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 100.53 ft³ = 752 gal.

Average Daily Flow		Peak Hour Flow	
Wet Well Fill Time:	41.18 min.	Wet Well Fill Time:	10.29 min.
Wet Well Empty Time:	8.89 min.	Wet Well Empty Time:	13.01 min.
Total Pump Starts / Hour:	1.20	Total Pump Starts / Hour:	2.57
Starts / Hour / Pump:	0.60	Starts / Hour / Pump:	1.29
Est. Daily Pump Run Hours	4.26 hrs	Est. Daily Pump Run Hours	13.40 hrs

Storage and Response Times

Storage Volume Above High Alarm: 125.66 ft³ = 940.03 gal.
 ADF Response time for Double Pump/Power Failure: 51.47 min.
 PHF Response time for Double Pump/Power Failure: 12.87 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Golf Course Pump Station (Assumed):	150 gpm
Point Chautauqua PS Design Point Flow:	100 gpm
KOA Campground PS Design Point Flow:	75 gpm
Bayberry Landing PS Design Point Flow:	30 gpm
Dewittville/	Total No. of Grinder Pumps: 29
Southern Town of	No. of Grinder Pumps Running at Once: 5
Chautauqua	Downstream Flow (11 gpm per pump): 55 gpm

Min. Force Main Flow =	100 gpm	Dewittville Pump Station Only
Avg. Force Main Flow =	203 gpm	Dewittville + 25% of Potential Downstream Flow
Peak Force Main Flow =	510 gpm	Dewittville + All Potential Downstream Flow



Dewittville Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,302 ft.
 End Elevation: 1,364 ft.
 Static Head: 62.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 1,250 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.6	0.5
40	2.0	1.1
60	4.3	1.6
80	7.3	2.2
100	11.0	2.7
125	16.6	3.4

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 5,450 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	2.2	0.8
203	8.2	1.6
300	16.8	2.3
400	28.6	3.1
500	43.2	3.8
510	44.8	3.9

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - High Point

Static Head

Start Elevation: 1,302 ft.
 End Elevation: 1,317 ft.
 Static Head: 15.00 ft.

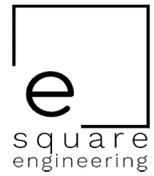
4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 1,250 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.6	0.5
40	2.0	1.1
60	4.3	1.6
80	7.3	2.2
100	11.0	2.7
120	15.4	3.3

Min./Avg./Peak Force Main Flow

Project: 125.001
Subject: Dewittville Pump Station Preliminary Calculations - Option 1
Calculated by: AJM
Checked by: MJZ
Date: 11/14/2024



Dewittville Pump Station - Preliminary Calculations

Pump Design Data

Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
75 feet	81 feet	118 feet	26 feet

Preliminary Design Point Selection: 100 GPM @ 118 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Service Area Flows

KOA Campground	Est. Avg. Day Flow:	17,745	gpd	=	12	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	70,980	gpd	=	49	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	75	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1405.00	ft	High Level Alarm =	1398.50	ft
Bottom of Wet Well =	1395.00	ft	Lag Pump On Elevation =	1398.25	ft
Inlet Invert Elevation =	1400.00	ft	Lead Pump On Elevation =	1398.00	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1397.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 28.27 ft³ = 212 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	17.16	min.	Wet Well Fill Time:	4.29	min.
Wet Well Empty Time:	3.28	min.	Wet Well Empty Time:	4.67	min.
Total Pump Starts / Hour:	2.93		Total Pump Starts / Hour:	6.69	
Starts / Hour / Pump:	1.47		Starts / Hour / Pump:	3.35	
Est. Daily Pump Run Hours	3.85	hrs	Est. Daily Pump Run Hours	12.51	hrs

Storage and Response Times

Storage Volume Above High Alarm: 42.41 ft³ = 317.26 gal.
 ADF Response time for Double Pump/Power Failure: 25.75 min.
 PHF Response time for Double Pump/Power Failure: 6.44 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Golf Course Pump Station (Assumed):	150	gpm
Dewittville PS Design Point Flow:	100	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	16
	No. of Grinder Pumps Running at Once:	4
	Downstream Flow (11 gpm per pump):	44 gpm

Min. Force Main Flow =	75	gpm	<i>KOA Pump Station Only</i>
Avg. Force Main Flow =	181	gpm	<i>KOA + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	499	gpm	<i>KOA + All Potential Downstream Flow</i>

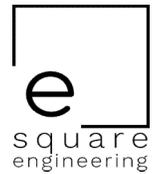
Project: 125.001

Subject: KOA Campground Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,364 ft.
 Static Head: -33.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,000 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	1.3	0.5
40	4.9	1.1
60	10.3	1.6
75	15.5	2.0
80	17.5	2.2

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 3,400 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	0.8	0.6
181	4.1	1.4
300	10.5	2.3
400	17.8	3.1
499	26.8	3.8
500	26.9	3.8

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,440 ft.
 Static Head: 43.00 ft.

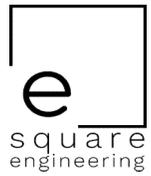
4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 400 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.2	0.5
40	0.6	1.1
60	1.4	1.6
75	2.1	2.0
80	2.3	2.2

Min./Avg./Peak Force Main Flow

Project: 125.001
Subject: KOA Campground Pump Station Preliminary Calculations - Option 1
Calculated by: AJM
Checked by: MJZ
Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Pump Design Data

Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
-17 feet	-13 feet	9 feet	45 feet

Preliminary Design Point Selection: 75 GPM @ 45 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Bayberry Landing Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Bayberry Landing Pump Station - Preliminary Calculations

Service Area Flows

Bayberry Landing	Est. Avg. Day Flow:	2,600	gpd	=	2	gpm
	Peaking Factor:	6	<i>*Based on DMR Data</i>			
	Peak Flow Conditions:	15,600	gpd	=	11	gpm

Pump Station Design Flow

Nominal Dia.:	2	in.	Minimum Pumping Rate:	18	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	30	gpm
Pipe Standard:	IPS				
Pipe Class:	DR11				
Actual ID:	1.92	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1332.00	ft	High Level Alarm =	1326.00	ft
Bottom of Wet Well =	1322.00	ft	Lag Pump On Elevation =	1325.75	ft
Inlet Invert Elevation =	1327.00	ft	Lead Pump On Elevation =	1325.50	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1324.00	ft
Inside Diameter of WW =	4.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	78.09	min.	Wet Well Fill Time:	13.02	min.
Wet Well Empty Time:	4.98	min.	Wet Well Empty Time:	6.40	min.
Total Pump Starts / Hour:	0.72		Total Pump Starts / Hour:	3.09	
Starts / Hour / Pump:	0.36		Starts / Hour / Pump:	1.55	
Est. Daily Pump Run Hours	1.44	hrs	Est. Daily Pump Run Hours	7.91	hrs

Storage and Response Times

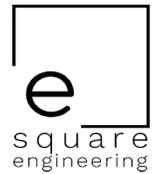
Storage Volume Above High Alarm: 12.57 ft³ = 94.00 gal.
 ADF Response time for Double Pump/Power Failure: 52.06 min.
 PHF Response time for Double Pump/Power Failure: 8.68 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Golf Course Pump Station (Assumed):	150	gpm
Dewittville PS Design Point Flow:	100	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	4
	No. of Grinder Pumps Running at Once:	3
	Downstream Flow (11 gpm per pump):	33 gpm

Min. Force Main Flow =	30	gpm	<i>Bayberry Pump Station Only</i>
Avg. Force Main Flow =	145	gpm	<i>Bayberry + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	488	gpm	<i>Bayberry + All Potential Downstream Flow</i>

Project: 125.001
 Subject: Bayberry Landing Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Bayberry Landing Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,324 ft.
 End Elevation: 1,364 ft.
 Static Head: 40.00 ft.

2" Force Main Dynamic Head

Nominal Dia.: 2 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 1.92 in.
 Length: 100 ft.
 C-Value: 130

Flow (gpm)	2" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
10	0.4	1.1
20	1.4	2.2
30	2.9	3.3
40	4.9	4.4
50	7.5	5.5

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 1,950 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.1	0.2
145	1.6	1.1
225	3.5	1.7
300	6.0	2.3
375	9.1	2.9
488	14.8	3.7

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
43 feet	44 feet	58 feet

Preliminary Design Point Selection: 30 GPM @ 58 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001

Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Service Area Flows

Golf Course Pump Station Flow Rate (Assumed):	150	gpm
Point Chuatauqua Pump Station Design Flow Rate:	100	gpm
Dewittville Pump Station Design Flow Rate:	100	gpm
KOA Pump Station Design Flow Rate:	75	gpm
Bayberry Landing Pump Station Design Flow Rate:	30	gpm
Total No. of Grinder Pumps:	38	
Grinder Pumps No. of Grinder Pumps Running at Once:	6	
Flow Rate Flow (11 gpm per pump):	66	gpm
Crosswinds Marina Est. Avg. Day Flow:	3,700	gpd = 3 gpm
Est. Max. Day Flow:	21,200	gpd = 15 gpm

Peak Service Area Flow =	536	gpm
Average Service Area Flow =	145	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	10	in.	Minimum Pumping Rate:	393	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	550	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	8.961	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1369.00	ft	High Level Alarm =	1361.50	ft
Bottom of Wet Well =	1357.00	ft	Lag Pump On Elevation =	1361.25	ft
Inlet Invert Elevation =	1364.00	ft	Lead Pump On Elevation =	1361.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1359.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	8.11	min.	Wet Well Fill Time:	2.19	min.
Wet Well Empty Time:	2.70	min.	Wet Well Empty Time:	4.22	min.
Total Pump Starts / Hour:	5.55		Total Pump Starts / Hour:	9.36	
Starts / Hour / Pump:	2.78		Starts / Hour / Pump:	4.68	
Est. Daily Pump Run Hours	6.00	hrs	Est. Daily Pump Run Hours	15.79	hrs

Storage and Response Times

Storage Volume Above High Alarm:	196.35	ft ³ = 1468.79	gal.
ADF Response time for Double Pump/Power Failure:	10.13	min.	
PHF Response time for Double Pump/Power Failure:	2.74	min.	

Project: 125.001

Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Overlook Avenue PS Design Point Flow:	30	gpm
Total No. of Grinder Pumps:	48	
North Ellery 1, 2, 3 No. of Grinder Pumps Running at Once:	6	
Downstream Flow (11 gpm per pump):	66	gpm

Min. Force Main Flow =	550	gpm	Crosswinds Marina Pump Station Only
Avg. Force Main Flow =	574	gpm	Crosswinds Marina + 25% of Potential Downstream Flow
Peak Force Main Flow =	646	gpm	Crosswinds Marina + All Potential Downstream Flow

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,363	ft.
Static Head:	4.00	ft.

10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	12,150	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
150	3.8	0.8
300	13.9	1.5
450	29.3	2.3
550	42.5	2.8
577	46.4	2.9
656	58.9	3.3
700	66.4	3.6

Min. Force Main Flow
Avg. Force Main Flow
Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,475	ft.
Static Head:	116.00	ft.

10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	4,350	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
150	1.4	0.8
300	5.0	1.5
450	10.5	2.3
550	15.2	2.8
577	16.6	2.9
656	21.1	3.3
700	23.8	3.6

Min. Force Main Flow
Avg. Force Main Flow
Peak Force Main Flow

Pump Design Data

To Discharge			To High Point		
Min. Flow	Avg. Flow	Peak Flow	Min. Flow	Avg. Flow	Peak Flow
47 feet	50 feet	63 feet	131 feet	133 feet	137 feet

Preliminary Design Point Selection: 550 GPM @ 137 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Overlook Avenue Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Overlook Avenue Pump Station - Preliminary Calculations

Service Area Flows

Gravity Sewer

No. of EDUs	8 @ 225 gpd/EDU
Est. Avg. Day Flow:	1,800 gpd = 1.25 gpm
Peaking Factor:	4
Peak Flow Conditions:	7,200 gpd = 5.00 gpm

Grinder Pumps

Total No. of Grinder Pumps:	2
No. of Grinder Pumps Running at Once:	1
Downstream Flow (11 gpm per pump):	11 gpm

Average Service Area Flow =	12 gpm
Peak Service Area Flow =	16 gpm

Pump Station Design Flow

Nominal Dia.:	3 in.	Minimum Pumping Rate:	39 gpm
Pipe Type:	HDPE	Selected Pumping Rate:	30 gpm
Pipe Standard:	IPS	<i>Note: Selected pumping rate is lower than min. pump rate (2 ft/s) for a 3 inch for main because several grinder pumps are connected to the pump stations discharge immediately downstream</i>	
Pipe Class:	DR11		
Actual ID:	2.83 in.		

Wet Well Sizing

Wet Well Rim Elevation =	1370.00 ft	High Level Alarm =	1364.00 ft
Bottom of Wet Well =	1360.00 ft	Lag Pump On Elevation =	1363.75 ft
Inlet Invert Elevation =	1365.00 ft	Lead Pump On Elevation =	1363.50 ft
Wet Well Depth =	10.00 ft	Pump Off Elevation =	1362.00 ft
Inside Diameter of WW =	4.00 ft		

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow		Peak Hour Flow	
Wet Well Fill Time:	112.80 min.	Wet Well Fill Time:	28.20 min.
Wet Well Empty Time:	4.90 min.	Wet Well Empty Time:	5.48 min.
Total Pump Starts / Hour:	0.51	Total Pump Starts / Hour:	1.78
Starts / Hour / Pump:	0.25	Starts / Hour / Pump:	0.89
Est. Daily Pump Run Hours	1.00 hrs	Est. Daily Pump Run Hours	3.91 hrs

Storage and Response Times

Storage Volume Above High Alarm:	12.57 ft ³ = 94.00 gal.
ADF Response time for Double Pump/Power Failure:	75.20 min.
PHF Response time for Double Pump/Power Failure:	18.80 min.

Project: 125.001
 Subject: Overlook Avenue Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Overlook Avenue Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Crosswinds Pump Station Design Point Flow:		550 gpm
3" Force Main Grinder Pumps	Total No. of Grinder Pumps:	8
	No. of Grinder Pumps Running at Once:	3
	Downstream Flow (11 gpm per pump):	33 gpm
North Ellery 1, 2, 3 (10" Force Main)	Total No. of Grinder Pumps:	48
	No. of Grinder Pumps Running at Once:	6
	Downstream Flow (11 gpm per pump):	66 gpm

Min. Force Main Flow =	30 gpm	<i>Overlook Ave Pump Station Only</i>
Avg. Force Main Flow =	63 gpm	<i>Overlook Avenue + 25% of Potential Downstream Flow in 3"</i>
	184 gpm	<i>Overlook Avenue + 25% of Potential Downstream Flow in 10"</i>
Peak Force Main Flow =	63 gpm	<i>Overlook Avenue + All Potential Downstream Flow in 3"</i>
	646 gpm	<i>Overlook Avenue + All Potential Downstream Flow in 10"</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,362 ft.
 End Elevation: 1,363 ft.
 Static Head: 1.00 ft.

3" Force Main Dynamic Head

Nominal Dia.: 3 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 2.83 in.
 Length: 1,750 ft.
 C-Value: 130

Flow (gpm)	3" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	3.6	1.0
30	7.7	1.5
60	27.7	3.1
73	39.8	3.7
80	47.2	4.1

Min. Force Main Flow

Avg./Peak Force Main Flow

10" Force Main Dynamic Head

Nominal Dia.: 10 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 8.961 in.
 Length: 9,150 ft.
 C-Value: 130

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.1	0.2
194	4.7	1.0
300	10.4	1.5
400	17.8	2.0
500	26.8	2.5
600	37.6	3.1
656	44.4	3.3

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Project: 125.001
 Subject: County Route 46 Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Service Area Flows

Crosswinds Marina Pump Station Design Flow Rate:	550	gpm
Overlook Avenue Pump Station Design Flow Rate:	30	gpm
Total No. of Grinder Pumps:	48	
Grinder Pumps No. of Grinder Pumps Running at Once:	6	
Flow Rate Flow (11 gpm per pump):	66	gpm

Peak Service Area Flow =	646	gpm
Average Service Area Flow =	162	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	10	in.	Minimum Pumping Rate:	393	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	400	gpm
Pipe Standard:	DIPS		<i>Note : The Selected Pumping Rate is lower than Peak Service Area Flow because it is recommended for a flow equalization tank to be installed at this pump station to reduce stress on downstream infrastructure.</i>		
Pipe Class:	DR11				
Actual ID:	8.961	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1374.00	ft	High Level Alarm =	1366.50	ft
Bottom of Wet Well =	1362.00	ft	Lag Pump On Elevation =	1366.25	ft
Inlet Invert Elevation =	1369.00	ft	Lead Pump On Elevation =	1366.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1364.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	7.28	min.	Wet Well Fill Time:	1.82	min.
Wet Well Empty Time:	4.12	min.	Wet Well Empty Time:	7.68	min.
Total Pump Starts / Hour:	5.26		Total Pump Starts / Hour:	6.32	
Starts / Hour / Pump:	2.63		Starts / Hour / Pump:	3.16	
Est. Daily Pump Run Hours	8.68	hrs	Est. Daily Pump Run Hours	19.41	hrs

Storage and Response Times

Storage Volume Above High Alarm: 196.35 ft³ = 1468.79 gal.
 ADF Response time for Double Pump/Power Failure: 9.09 min.
 PHF Response time for Double Pump/Power Failure: 2.27 min.



County Route 46 Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Ex. 10" Force Main - Part 1

Maple Springs Pump Station Design Point Flow:	275	gpm
Sunset Bay Grinder Pump Station Flow:	30	gpm
Bemus School Grinder Pump Station Flow:	30	gpm

Min. Force Main Flow =	400	gpm	County Route 46 Pump Station Only
Avg. Force Main Flow =	484	gpm	County Route 46 + 25% of Potential Downstream Flow
Peak Force Main Flow =	735	gpm	County Route 46 + All Potential Downstream Flow

Ex. 10" Force Main - Part 2

Bemus Point Pump Station Design Point Flow:	360	gpm
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Min. Force Main Flow =	400	gpm	County Route 46 Pump Station Only
Avg. Force Main Flow =	574	gpm	County Route 46 + 25% of Potential Downstream Flow
Peak Force Main Flow =	1095	gpm	County Route 46 + All Potential Downstream Flow

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,310	ft.
Static Head:	-54.50	ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	8,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.2	0.5
200	4.5	1.0
300	9.5	1.5
400	16.1	2.0
500	24.3	2.5
600	34.1	3.1

Min./Avg./Peak Force Main Flow

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.
Pipe Type:	PVC	
Actual ID:	9.79	in.
Length:	15,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
150	3.1	0.6
300	11.3	1.3
400	19.3	1.7
484	27.5	2.1
600	40.9	2.6
735	59.5	3.1

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

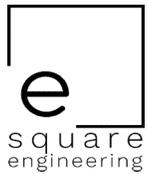
Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point - Continued

Ex. 10" Force Main Dynamic Head - Part 2

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe		
Pipe Type:	PVC			TDH (ft)	V (ft/s)	
Actual ID:	9.79	in.	0	0.0	0.0	
Length:	3,200	ft.	150	0.7	0.6	
C-Value:	130		300	2.4	1.3	
			400	4.0	1.7	Min. Force Main Flow
			574	7.9	2.4	Avg. Force Main Flow
			750	12.9	3.2	
			1095	26.0	4.7	Peak Force Main Flow

Headloss Calculations - Force Main High Point 1

Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,470	ft.
Static Head:	106	ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe		
Pipe Type:	HDPE			TDH (ft)	V (ft/s)	
Pipe Standard:	DIPS		0	0.0	0.0	
Pipe Class:	DR11		10	0.0	0.1	
Actual ID:	8.961	in.	200	2.4	1.0	
Length:	4,500	ft.	300	5.1	1.5	
C-Value:	130		400	8.7	2.0	Min./Avg./Peak Force Main Flow
			500	13.2	2.5	
			600	18.5	3.1	

Headloss Calculations - Force Main High Point 2

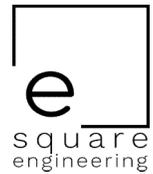
Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,337	ft.
Static Head:	-27.00	ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe		
Pipe Type:	HDPE			TDH (ft)	V (ft/s)	
Pipe Standard:	DIPS		0	0.0	0.0	
Pipe Class:	DR11		100	1.2	0.5	
Actual ID:	8.961	in.	200	4.5	1.0	
Length:	8,300	ft.	300	9.5	1.5	
C-Value:	130		400	16.1	2.0	Min./Avg./Peak Force Main Flow
			500	24.3	2.5	
			600	34.1	3.1	

Project: 125.001
 Subject: County Route 46 Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Force Main High Point 2 - Continued

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe	
Pipe Type:	PVC		TDH (ft)	V (ft/s)	
Actual ID:	9.79	in.	0	0.0	0.0
Length:	7,300	ft.	150	1.5	0.0
C-Value:	130		300	5.4	0.0
			400	9.2	0.0
			484	13.1	0.0
			600	19.5	0.0
			735	28.4	0.0
					Min. Force Main Flow
					Avg. Force Main Flow
					Peak Force Main Flow

Pump Design Data

<u>To Discharge</u>			<u>To High Point 1</u>	<u>To High Point 2</u>		
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak	Min. Flow	Avg. Flow	Peak Flow
-15 feet	-3 feet	47 feet	115 feet	-2 feet	2 feet	18 feet

Preliminary Design Point Selection: 400 GPM @ 115 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Collection System Alternative No. 1 - "Hybrid" Collection System

**Option No. 2 - All flow to SCCLSD WWTP
without the Potential Golf Course Development**

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Service Area Flows

Point Chautauqua	Est. Avg. Day Flow:	23,400	gpd	=	16	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	93,600	gpd	=	65	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	100	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1324.00	ft	High Level Alarm =	1316.50	ft
Bottom of Wet Well =	1312.00	ft	Lag Pump On Elevation =	1316.25	ft
Inlet Invert Elevation =	1319.00	ft	Lead Pump On Elevation =	1316.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1314.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 56.55 ft³ = 423 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	26.03	min.	Wet Well Fill Time:	6.51	min.
Wet Well Empty Time:	4.92	min.	Wet Well Empty Time:	6.98	min.
Total Pump Starts / Hour:	1.94		Total Pump Starts / Hour:	4.45	
Starts / Hour / Pump:	0.97		Starts / Hour / Pump:	2.22	
Est. Daily Pump Run Hours	3.81	hrs	Est. Daily Pump Run Hours	12.42	hrs

Storage and Response Times

Storage Volume Above High Alarm:	70.69	ft ³	=	528.77	gal.
ADF Response time for Double Pump/Power Failure:	32.54	min.			
PHF Response time for Double Pump/Power Failure:	8.13	min.			

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

6" Force Main

Dewittville PS Design Point Flow:	100	gpm	
Dewittville/ Southern Town of Chautauqua	Total No. of Grinder Pumps:	12	
	No. of Grinder Pumps Running at Once:	4	
	Downstream Flow (11 gpm per pump):	44	gpm

Min. Force Main Flow =	100	gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	136	gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	244	gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

8" Force Main

Dewittville PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Dewittville/ Southern Town of Chautauqua	Total No. of Grinder Pumps:	29
	No. of Grinder Pumps Running at Once:	5
	Downstream Flow (11 gpm per pump):	55 gpm

Min. Force Main Flow =	100 gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	165 gpm	<i>Point Chautauqua + 25% from Downstream Pump Stations</i>
Peak Force Main Flow =	360 gpm	<i>Point Chautauqua + All Downstream Pump Stations</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,314	ft.
End Elevation:	1,364	ft.
Static Head:	50.00	ft.

4" Force Main Dynamic Head

Nominal Dia.:	4	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	3.876	in.
Length:	6,150	ft.
C-Value:	130	

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
25	4.2	0.7
50	15.0	1.4
75	31.8	2.0
100	54.2	2.7
125	81.9	3.4

Min./Avg./Peak Force Main Flow

6" Force Main Dynamic Head

Nominal Dia.:	6	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	5.571	in.
Length:	2,050	ft.
C-Value:	130	

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
50	0.9	0.7
100	3.1	1.3
136	5.5	1.8
200	11.1	2.6
244	16.1	3.2
250	16.8	3.3

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

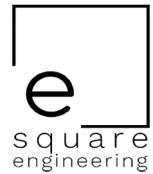
8" Force Main Dynamic Head

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	3,400	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.4	0.8
165	3.5	1.3
225	6.2	1.7
300	10.5	2.3
360	14.7	2.8
375	15.8	2.9

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Headloss Calculations - High Point

Static Head

Start Elevation: 1,314 ft.
 End Elevation: 1,379 ft.
 Static Head: 65.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,100 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
25	2.1	0.7
50	7.6	1.4
75	16.0	2.0
100	27.3	2.7
125	41.3	3.4

Min./Avg./Peak Force Main Flow

Pump Design Data

Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
109 feet	113 feet	135 feet	92 feet

Preliminary Design Point Selection: 100 GPM @ 135 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Dewittville Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Dewittville Pump Station - Preliminary Calculations

Service Area Flows

Dewittville	Est. Avg. Day Flow:	26,300 gpd	=	18 gpm
	Peaking Factor:	4		
	Peak Flow Conditions:	105,200 gpd	=	73 gpm

Pump Station Design Flow

Nominal Dia.:	4 in.	Minimum Pumping Rate:	74 gpm
Pipe Type:	HDPE	Selected Pumping Rate:	100 gpm
Pipe Standard:	DIPS		
Pipe Class:	DR11		
Actual ID:	3.876 in.		

Wet Well Sizing

Wet Well Rim Elevation =	1312.00 ft	High Level Alarm =	1304.50 ft
Bottom of Wet Well =	1300.00 ft	Lag Pump On Elevation =	1304.25 ft
Inlet Invert Elevation =	1307.00 ft	Lead Pump On Elevation =	1304.00 ft
Wet Well Depth =	12.00 ft	Pump Off Elevation =	1302.00 ft
Inside Diameter of WW =	6.00 ft		

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 56.55 ft³ = 423 gal.

Average Daily Flow		Peak Hour Flow	
Wet Well Fill Time:	23.16 min.	Wet Well Fill Time:	5.79 min.
Wet Well Empty Time:	5.00 min.	Wet Well Empty Time:	7.32 min.
Total Pump Starts / Hour:	2.13	Total Pump Starts / Hour:	4.58
Starts / Hour / Pump:	1.07	Starts / Hour / Pump:	2.29
Est. Daily Pump Run Hours	4.26 hrs	Est. Daily Pump Run Hours	13.40 hrs

Storage and Response Times

Storage Volume Above High Alarm: 70.69 ft³ = 528.77 gal.
 ADF Response time for Double Pump/Power Failure: 28.95 min.
 PHF Response time for Double Pump/Power Failure: 7.24 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

6" Force Main

Point Chautauqua PS Design Point Flow:	100 gpm
Dewittville/ Total No. of Grinder Pumps:	12
Southern Town of No. of Grinder Pumps Running at Once:	4
Chautauqua Downstream Flow (11 gpm per pump):	44 gpm

Min. Force Main Flow =	100 gpm	<i>Dewittville Pump Station Only</i>
Avg. Force Main Flow =	136 gpm	<i>Dewittville + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	244 gpm	<i>Dewittville + All Potential Downstream Flow</i>

Project: 125.001
 Subject: Dewittville Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Dewittville Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

8" Force Main

Dewittville PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Dewittville/ Southern Town of Chautauqua	Total No. of Grinder Pumps:	29
	No. of Grinder Pumps Running at Once:	5
	Downstream Flow (11 gpm per pump):	55 gpm
Min. Force Main Flow =	100	gpm
Avg. Force Main Flow =	165	gpm
Peak Force Main Flow =	360	gpm

Dewittville Pump Station Only
Dewittville + 25% of Potential Downstream Flow
Dewittville + All Potential Downstream Flow

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,302 ft.
 End Elevation: 1,364 ft.
 Static Head: 62.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 1,250 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.6	0.5
40	2.0	1.1
60	4.3	1.6
80	7.3	2.2
100	11.0	2.7
125	16.6	3.4

Min./Avg./Peak Force Main Flow

6" Force Main Dynamic Head

Nominal Dia.: 6 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 5.571 in.
 Length: 2,050 ft.
 C-Value: 130

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
50	0.9	0.7
100	3.1	1.3
136	5.5	1.8
200	11.1	2.6
244	16.1	3.2
250	16.8	3.3

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 3,400 ft.
 C-Value: 130

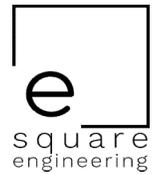
Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.4	0.8
165	3.5	1.3
225	6.2	1.7
300	10.5	2.3
360	14.7	2.8
375	15.8	2.9

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Project: 125.001
 Subject: Dewittville Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Dewittville Pump Station - Preliminary Calculations

Headloss Calculations - High Point

Static Head

Start Elevation: 1,302 ft.
 End Elevation: 1,317 ft.
 Static Head: 15.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 1,250 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.6	0.5
40	2.0	1.1
60	4.3	1.6
80	7.3	2.2
100	11.0	2.7
125	16.6	3.4

Min./Avg./Peak Force Main Flow

Pump Design Data

Design Head

To Discharge			To High Point
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
77 feet	82 feet	104 feet	26 feet

Preliminary Design Point Selection: 100 GPM @ 104 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Service Area Flows

KOA Campground	Est. Avg. Day Flow:	17,745	gpd	=	12	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	70,980	gpd	=	49	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	75	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1405.00	ft	High Level Alarm =	1398.50	ft
Bottom of Wet Well =	1395.00	ft	Lag Pump On Elevation =	1398.25	ft
Inlet Invert Elevation =	1400.00	ft	Lead Pump On Elevation =	1398.00	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1397.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 28.27 ft³ = 212 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	17.16	min.	Wet Well Fill Time:	4.29	min.
Wet Well Empty Time:	3.28	min.	Wet Well Empty Time:	4.67	min.
Total Pump Starts / Hour:	2.93		Total Pump Starts / Hour:	6.69	
Starts / Hour / Pump:	1.47		Starts / Hour / Pump:	3.35	
Est. Daily Pump Run Hours	3.85	hrs	Est. Daily Pump Run Hours	12.51	hrs

Storage and Response Times

Storage Volume Above High Alarm: 42.41 ft³ = 317.26 gal.
 ADF Response time for Double Pump/Power Failure: 25.75 min.
 PHF Response time for Double Pump/Power Failure: 6.44 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Dewittville PS Design Point Flow:	100	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	16
	No. of Grinder Pumps Running at Once:	4
	Downstream Flow (11 gpm per pump):	44 gpm

Min. Force Main Flow =	75 gpm	<i>KOA Pump Station Only</i>
Avg. Force Main Flow =	144 gpm	<i>KOA + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	349 gpm	<i>KOA + All Potential Downstream Flow</i>

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,364 ft.
 Static Head: -33.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,000 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	1.3	0.5
40	4.9	1.1
60	10.3	1.6
75	15.5	2.0
80	17.5	2.2

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 3,400 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
50	0.4	0.4
75	0.8	0.6
144	2.7	1.1
200	4.9	1.5
250	7.5	1.9
349	13.9	2.7
350	13.9	2.7

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,440 ft.
 Static Head: 43.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 400 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.2	0.5
40	0.6	1.1
60	1.4	1.6
75	2.1	2.0
80	2.3	2.2

Min./Avg./Peak Force Main Flow

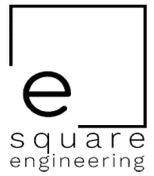
Project: 125.001

Subject: KOA Campground Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Pump Design Data

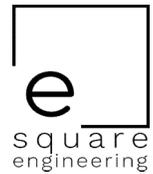
Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
-17 feet	-15 feet	-4 feet	45 feet

Preliminary Design Point Selection: 75 GPM @ 45 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Bayberry Landing Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Bayberry Landing Pump Station - Preliminary Calculations

Service Area Flows

Bayberry Landing	Est. Avg. Day Flow:	2,600	gpd	=	2	gpm
	Peaking Factor:	6	<i>*Based on DMR Data</i>			
	Peak Flow Conditions:	15,600	gpd	=	11	gpm

Pump Station Design Flow

Nominal Dia.:	2	in.	Minimum Pumping Rate:	18	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	30	gpm
Pipe Standard:	IPS				
Pipe Class:	DR11				
Actual ID:	1.92	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1332.00	ft	High Level Alarm =	1326.00	ft
Bottom of Wet Well =	1322.00	ft	Lag Pump On Elevation =	1325.75	ft
Inlet Invert Elevation =	1327.00	ft	Lead Pump On Elevation =	1325.50	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1324.00	ft
Inside Diameter of WW =	4.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	78.09	min.	Wet Well Fill Time:	13.02	min.
Wet Well Empty Time:	4.98	min.	Wet Well Empty Time:	6.40	min.
Total Pump Starts / Hour:	0.72		Total Pump Starts / Hour:	3.09	
Starts / Hour / Pump:	0.36		Starts / Hour / Pump:	1.55	
Est. Daily Pump Run Hours	1.44	hrs	Est. Daily Pump Run Hours	7.91	hrs

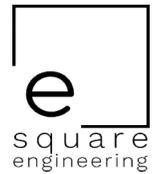
Storage and Response Times

Storage Volume Above High Alarm:	12.57	ft ³	=	94.00	gal.
ADF Response time for Double Pump/Power Failure:	52.06	min.			
PHF Response time for Double Pump/Power Failure:	8.68	min.			

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Dewittville PS Design Point Flow:	100	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	4
	No. of Grinder Pumps Running at Once:	3
	Downstream Flow (11 gpm per pump):	33 gpm

Min. Force Main Flow =	30	gpm	<i>Bayberry Pump Station Only</i>
Avg. Force Main Flow =	107	gpm	<i>Bayberry + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	338	gpm	<i>Bayberry + All Potential Downstream Flow</i>



Bayberry Landing Pump Station - Preliminary Calculations

Headloss Calculations - Discharge/High Point

Static Head

Start Elevation: 1,324 ft.
 End Elevation: 1,364 ft.
 Static Head: 40.00 ft.

2" Force Main Dynamic Head

Nominal Dia.: 2 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 1.92 in.
 Length: 100 ft.
 C-Value: 130

Flow (gpm)	2" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
10	0.4	1.1
20	1.4	2.2
30	2.9	3.3
40	4.9	4.4
50	7.5	5.5

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 1,950 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.1	0.2
107	0.9	0.8
225	3.5	1.7
300	6.0	2.3
338	7.5	2.6
375	9.1	2.9

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
43 feet	44 feet	50 feet

Preliminary Design Point Selection: 30 GPM @ 50 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Service Area Flows

Point Chuatauqua Pump Station Design Flow Rate:	100	gpm
Dewittville Pump Station Design Flow Rate:	100	gpm
KOA Pump Station Design Flow Rate:	75	gpm
Bayberry Landing Pump Station Design Flow Rate:	30	gpm
Total No. of Grinder Pumps:	38	
Grinder Pumps No. of Grinder Pumps Running at Once:	6	
Flow Rate Flow (11 gpm per pump):	66	gpm

Peak Service Area Flow =	371	gpm
Avg. Service Area Flow =	93	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	8	in.	Minimum Pumping Rate:	261	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	400	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	7.305	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1369.00	ft	High Level Alarm =	1362.00	ft
Bottom of Wet Well =	1357.00	ft	Lag Pump On Elevation =	1361.75	ft
Inlet Invert Elevation =	1364.00	ft	Lead Pump On Elevation =	1361.50	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1359.00	ft
Inside Diameter of WW =	12.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 282.74 ft³ = 2,115 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	22.80	min.	Wet Well Fill Time:	5.70	min.
Wet Well Empty Time:	6.51	min.	Wet Well Empty Time:	10.19	min.
Total Pump Starts / Hour:	2.05		Total Pump Starts / Hour:	3.78	
Starts / Hour / Pump:	1.02		Starts / Hour / Pump:	1.89	
Est. Daily Pump Run Hours	5.33	hrs	Est. Daily Pump Run Hours	15.39	hrs

Storage and Response Times

Storage Volume Above High Alarm: 226.19 ft³ = 1692.05 gal.
 ADF Response time for Double Pump/Power Failure: 18.24 min.
 PHF Response time for Double Pump/Power Failure: 4.56 min.

Project: 125.001
 Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Overlook Avenue PS Design Point Flow:	30 gpm
Total No. of Grinder Pumps:	48
North Ellery 1, 2, 3 No. of Grinder Pumps Running at Once:	6
Downstream Flow (11 gpm per pump):	66 gpm

Min. Force Main Flow =	400 gpm	<i>Crosswinds Marina Pump Station Only</i>
Avg. Force Main Flow =	424 gpm	<i>Crosswinds Marina + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	496 gpm	<i>Crosswinds Marina + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,359 ft.
 End Elevation: 1,363 ft.
 Static Head: 4.00 ft.

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 12,150 ft.
 C-Value: 130

Flow (gpm)	8" Pipe		
	TDH (ft)	V (ft/s)	
0	0.0	0.0	
100	4.9	0.8	
200	17.7	1.5	
300	37.4	2.3	
400	63.7	3.1	Min. Force Main Flow
427	71.9	3.3	Avg. Force Main Flow
500	96.3	3.8	
506	98.5	3.9	Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,359 ft.
 End Elevation: 1,475 ft.
 Static Head: 116.00 ft.

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 4,350 ft.
 C-Value: 130

Flow (gpm)	8" Pipe		
	TDH (ft)	V (ft/s)	
0	0.0	0.0	
100	1.8	0.8	
200	6.3	1.5	
300	13.4	2.3	
400	22.8	3.1	Min. Force Main Flow
424	25.4	3.2	Avg. Force Main Flow
500	34.5	3.8	
506	35.2	3.9	Peak Force Main Flow

Pump Design Data

To Discharge			To High Point		
Min. Flow	Avg. Flow	Peak Flow	Min. Flow	Avg. Flow	Peak Flow
68 feet	76 feet	102 feet	139 feet	141 feet	151 feet

Preliminary Design Point Selection: 400 GPM @ 151 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Overlook Avenue Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Overlook Avenue Pump Station - Preliminary Calculations

Service Area Flows

Gravity Sewer

No. of EDUs	8 @ 225 gpd/EDU
Est. Avg. Day Flow:	1,800 gpd = 1.25 gpm
Peaking Factor:	4
Peak Flow Conditions:	7,200 gpd = 5.00 gpm

Grinder Pumps

Total No. of Grinder Pumps:	2
No. of Grinder Pumps Running at Once:	1
Downstream Flow (11 gpm per pump):	11 gpm

Average Service Area Flow =	12 gpm
Peak Service Area Flow =	16 gpm

Pump Station Design Flow

Nominal Dia.:	3 in.	Minimum Pumping Rate:	39 gpm
Pipe Type:	HDPE	Selected Pumping Rate:	30 gpm
Pipe Standard:	IPS	<i>Note: Selected pumping rate is lower than min. pump rate (2 ft/s) for a 3 inch for main because several grinder pumps are connected to the pump stations discharge immediately downstream</i>	
Pipe Class:	DR11		
Actual ID:	2.83 in.		

Wet Well Sizing

Wet Well Rim Elevation =	1370.00 ft	High Level Alarm =	1364.00 ft
Bottom of Wet Well =	1360.00 ft	Lag Pump On Elevation =	1363.75 ft
Inlet Invert Elevation =	1365.00 ft	Lead Pump On Elevation =	1363.50 ft
Wet Well Depth =	10.00 ft	Pump Off Elevation =	1362.00 ft
Inside Diameter of WW =	4.00 ft		

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow		Peak Hour Flow	
Wet Well Fill Time:	112.80 min.	Wet Well Fill Time:	28.20 min.
Wet Well Empty Time:	4.90 min.	Wet Well Empty Time:	5.48 min.
Total Pump Starts / Hour:	0.51	Total Pump Starts / Hour:	1.78
Starts / Hour / Pump:	0.25	Starts / Hour / Pump:	0.89
Est. Daily Pump Run Hours	1.00 hrs	Est. Daily Pump Run Hours	3.91 hrs

Storage and Response Times

Storage Volume Above High Alarm:	12.57 ft ³ = 94.00 gal.
ADF Response time for Double Pump/Power Failure:	75.20 min.
PHF Response time for Double Pump/Power Failure:	18.80 min.

Project: 125.001
 Subject: Overlook Avenue Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Overlook Avenue Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Crosswinds Pump Station Design Point Flow:		400	gpm
3" Force Main Grinder Pumps	Total No. of Grinder Pumps:	8	
	No. of Grinder Pumps Running at Once:	3	
	Downstream Flow (11 gpm per pump):	33	gpm
North Ellery 1, 2, 3	Total No. of Grinder Pumps:	48	
	No. of Grinder Pumps Running at Once:	6	
	Downstream Flow (11 gpm per pump):	66	gpm

Min. Force Main Flow =	30	gpm	<i>Overlook Ave Pump Station Only</i>
Avg. Force Main Flow =	63	gpm	<i>Overlook Avenue + 25% of Potential Downstream Flow in 3"</i>
	147	gpm	<i>Overlook Avenue + 25% of Potential Downstream Flow in 10"</i>
Peak Force Main Flow =	63	gpm	<i>Overlook Avenue + All Potential Downstream Flow in 3"</i>
	496	gpm	<i>Overlook Avenue + All Potential Downstream Flow in 10"</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,362 ft.
 End Elevation: 1,363 ft.
 Static Head: 1.00 ft.

3" Force Main Dynamic Head

Nominal Dia.: 3 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 2.83 in.
 Length: 1,750 ft.
 C-Value: 130

Flow (gpm)	3" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	3.6	1.0
30	7.7	1.5
60	27.7	3.1
73	39.8	3.7
80	47.2	4.1

Min. Force Main Flow

Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 9,100 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.4	0.2
147	7.5	1.1
225	16.5	1.7
300	28.0	2.3
375	42.4	2.9
450	59.4	3.4
496	71.1	3.8

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

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 Calculated by: AJM
 Checked by: MJZ
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Overlook Avenue Pump Station - Preliminary Calculations

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,362 ft.
 End Elevation: 1,475 ft.
 Static Head: 113.00 ft.

3" Force Main Dynamic Head

Nominal Dia.: 3 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 2.83 in.
 Length: 1,750 ft.
 C-Value: 130

Flow (gpm)	3" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	3.6	1.0
30	7.7	1.5
60	27.7	3.1
73	39.8	3.7
80	47.2	4.1

Min. Force Main Flow

Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 1,300 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.1	1.5
147	1.1	7.5
225	2.4	11.5
300	4.0	15.3
375	6.1	19.1
450	8.5	22.9
496	10.2	25.3

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Pump Design Data

Design Head

To Discharge			To High Point		
Min. Flow	Avg. Flow	Peak Flow	Min. Flow	Avg. Flow	Peak Flow
9 feet	48 feet	112 feet	121 feet	122 feet	163 feet

Preliminary Design Point Selection: 30 GPM @ 163 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: County Route 46 Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Service Area Flows

Crosswinds Marina Pump Station Design Flow Rate:	400	gpm
Overlook Avenue Pump Station Design Flow Rate:	30	gpm
Total No. of Grinder Pumps:	48	
Grinder Pumps No. of Grinder Pumps Running at Once:	6	
Flow Rate Flow (11 gpm per pump):	66	gpm

Peak Service Area Flow =	496	gpm
Average Service Area Flow =	124	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	10	in.	Minimum Pumping Rate:	393	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	300	gpm
Pipe Standard:	DIPS		<i>Note : The Selected Pumping Rate is lower than Peak Service Area Flow because it is recommended for a flow equalization tank to be installed at this pump station to reduce stress on downstream infrastructure.</i>		
Pipe Class:	DR11				
Actual ID:	8.961	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1374.00	ft	High Level Alarm =	1366.50	ft
Bottom of Wet Well =	1362.00	ft	Lag Pump On Elevation =	1366.25	ft
Inlet Invert Elevation =	1369.00	ft	Lead Pump On Elevation =	1366.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1364.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	9.48	min.	Wet Well Fill Time:	2.37	min.
Wet Well Empty Time:	5.54	min.	Wet Well Empty Time:	10.39	min.
Total Pump Starts / Hour:	4.00		Total Pump Starts / Hour:	4.70	
Starts / Hour / Pump:	2.00		Starts / Hour / Pump:	2.35	
Est. Daily Pump Run Hours	8.85	hrs	Est. Daily Pump Run Hours	19.54	hrs

Storage and Response Times

Storage Volume Above High Alarm: 196.35 ft³ = 1468.79 gal.
 ADF Response time for Double Pump/Power Failure: 11.85 min.
 PHF Response time for Double Pump/Power Failure: 2.96 min.

County Route 46 Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Ex. 10" Force Main - Part 1

Maple Springs Pump Station Design Point Flow:	275	gpm
Sunset Bay Grinder Pump Station Flow:	30	gpm
Bemus School Grinder Pump Station Flow:	30	gpm

Min. Force Main Flow =	300	gpm	<i>County Route 46 Pump Station Only</i>
Avg. Force Main Flow =	384	gpm	<i>County Route 46 + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	635	gpm	<i>County Route 46 + All Potential Downstream Flow</i>

Ex. 10" Force Main - Part 2

Bemus Point Pump Station Design Point Flow:	360	gpm
---	-----	-----

Min. Force Main Flow =	300	gpm	<i>County Route 46 Pump Station Only</i>
Avg. Force Main Flow =	474	gpm	<i>County Route 46 + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	995	gpm	<i>County Route 46 + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,310	ft.
Static Head:	-54.50	ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	8,300	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.2	0.5
200	4.5	1.0
300	9.5	1.5
400	16.1	2.0
500	24.3	2.5

Min./Avg./Peak Force Main Flow

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.
Pipe Type:	PVC	
Actual ID:	9.79	in.
Length:	15,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	5.4	0.9
300	11.3	1.3
384	17.9	1.6
500	29.2	2.1
635	45.4	2.7
700	54.4	3.0

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point - Continued

Ex. 10" Force Main Dynamic Head - Part 2

Nominal Dia.:	10 in.	Flow (gpm)	10" Pipe	
Pipe Type:	PVC		TDH (ft)	V (ft/s)
Actual ID:	9.79 in.	0	0.0	0.0
Length:	3,200 ft.	200	1.1	0.9
C-Value:	130	300	2.4	1.3
		474	5.5	2.0
		500	6.1	2.1
		700	11.4	3.0
		995	21.8	4.2

Min. Force Main Flow
Avg. Force Main Flow
Peak Force Main Flow

Headloss Calculations - Force Main High Point 1

Static Head

Start Elevation:	1,364 ft.
End Elevation:	1,470 ft.
Static Head:	106 ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10 in.	Flow (gpm)	8" Pipe	
Pipe Type:	HDPE		TDH (ft)	V (ft/s)
Pipe Standard:	DIPS	0	0.0	0.0
Pipe Class:	DR11	100	0.7	0.5
Actual ID:	8.961 in.	200	2.4	1.0
Length:	4,500 ft.	300	5.1	1.5
C-Value:	130	400	8.7	2.0
		500	13.2	2.5

Min./Avg./Peak Force Main Flow

Headloss Calculations - Force Main High Point 2

Static Head

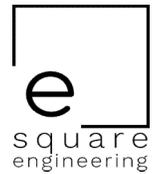
Start Elevation:	1,364 ft.
End Elevation:	1,337 ft.
Static Head:	-27.00 ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10 in.	Flow (gpm)	8" Pipe	
Pipe Type:	HDPE		TDH (ft)	V (ft/s)
Pipe Standard:	DIPS	0	0.0	0.0
Pipe Class:	DR11	100	1.2	0.5
Actual ID:	8.961 in.	200	4.5	1.0
Length:	8,300 ft.	300	9.5	1.5
C-Value:	130	400	16.1	2.0
		500	24.3	2.5

Min./Avg./Peak Force Main Flow

Project: 125.001
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 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Force Main High Point 2 - Continued

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe	
Pipe Type:	PVC		TDH (ft)	V (ft/s)	
Actual ID:	9.79	in.	0	0.0	0.0
Length:	7,300	ft.	200	5.4	0.9
C-Value:	130		300	11.3	1.3
			384	17.9	1.6
			500	29.2	2.1
			635	45.4	2.7
			700	54.4	3.0

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

Pump Design Data

<u>To Discharge</u>			<u>To High Point 1</u>	<u>To High Point 2</u>		
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak	Min. Flow	Avg. Flow	Peak Flow
-31 feet	-22 feet	22 feet	111 feet	-6 feet	0 feet	28 feet

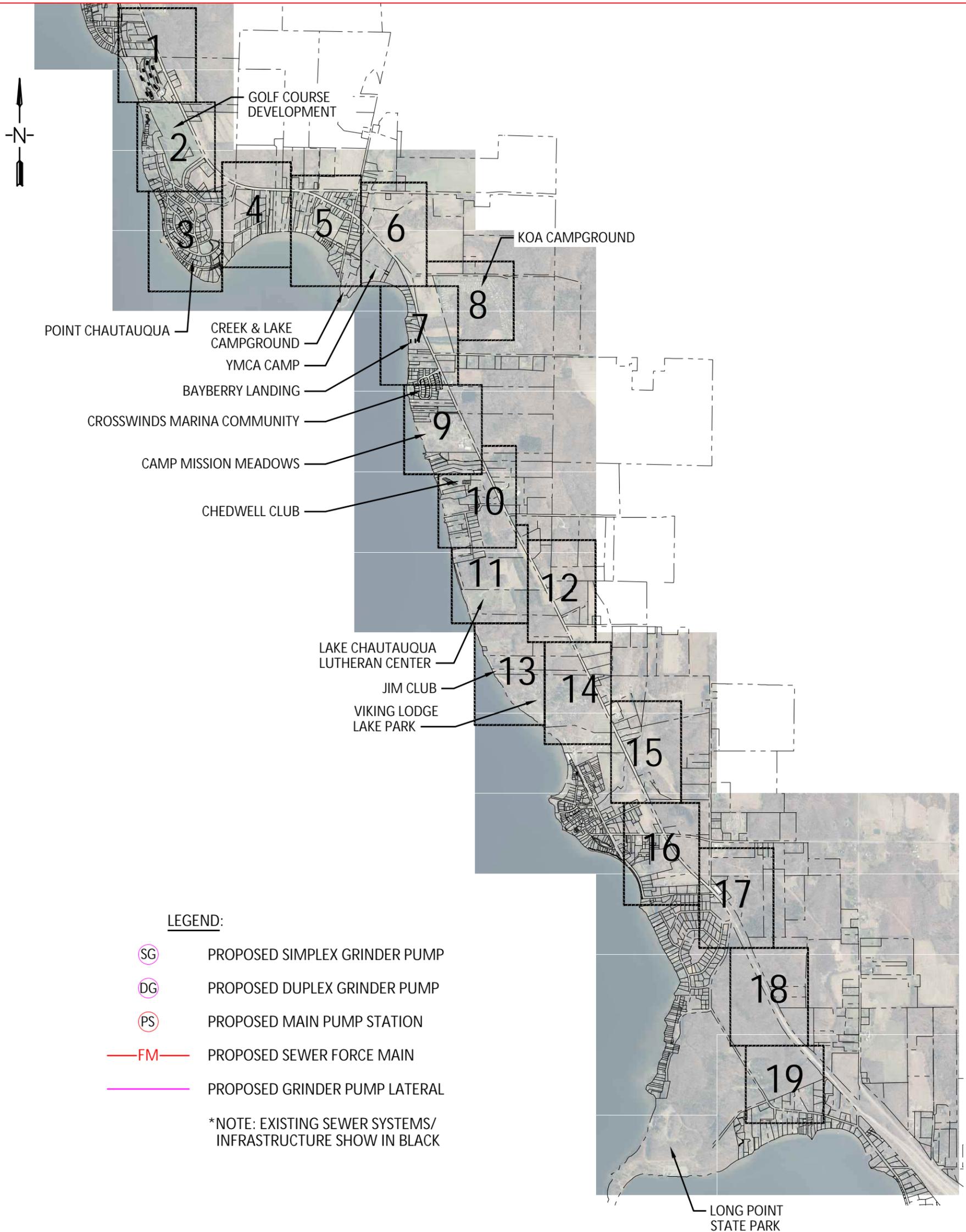
Preliminary Design Point Selection: 300 GPM @ 111 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Appendix O

LOW-Pressure Collection System – Option 1 – Preliminary Layout

**COLLECTION SYSTEM ALTERNATIVE NO. 2 - LOW-PRESSURE COLLECTION SYSTEM
OPTION NO. 1 - CONVEYANCE TO SCLSD WWTP (WITH GOLF COURSE DEVELOPMENT)
PRELIMINARY COLLECTION SYSTEM LAYOUT**



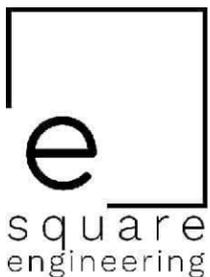
LEGEND:

- SG PROPOSED SIMPLEX GRINDER PUMP
- DG PROPOSED DUPLEX GRINDER PUMP
- PS PROPOSED MAIN PUMP STATION
- FM — PROPOSED SEWER FORCE MAIN
- PROPOSED GRINDER PUMP LATERAL

*NOTE: EXISTING SEWER SYSTEMS/
INFRASTRUCTURE SHOW IN BLACK



Note: Layouts are preliminary and are largely utilized for estimating quantities of piping required. Size and locations of infrastructure subject to change and shall be verified design engineer during final project design.

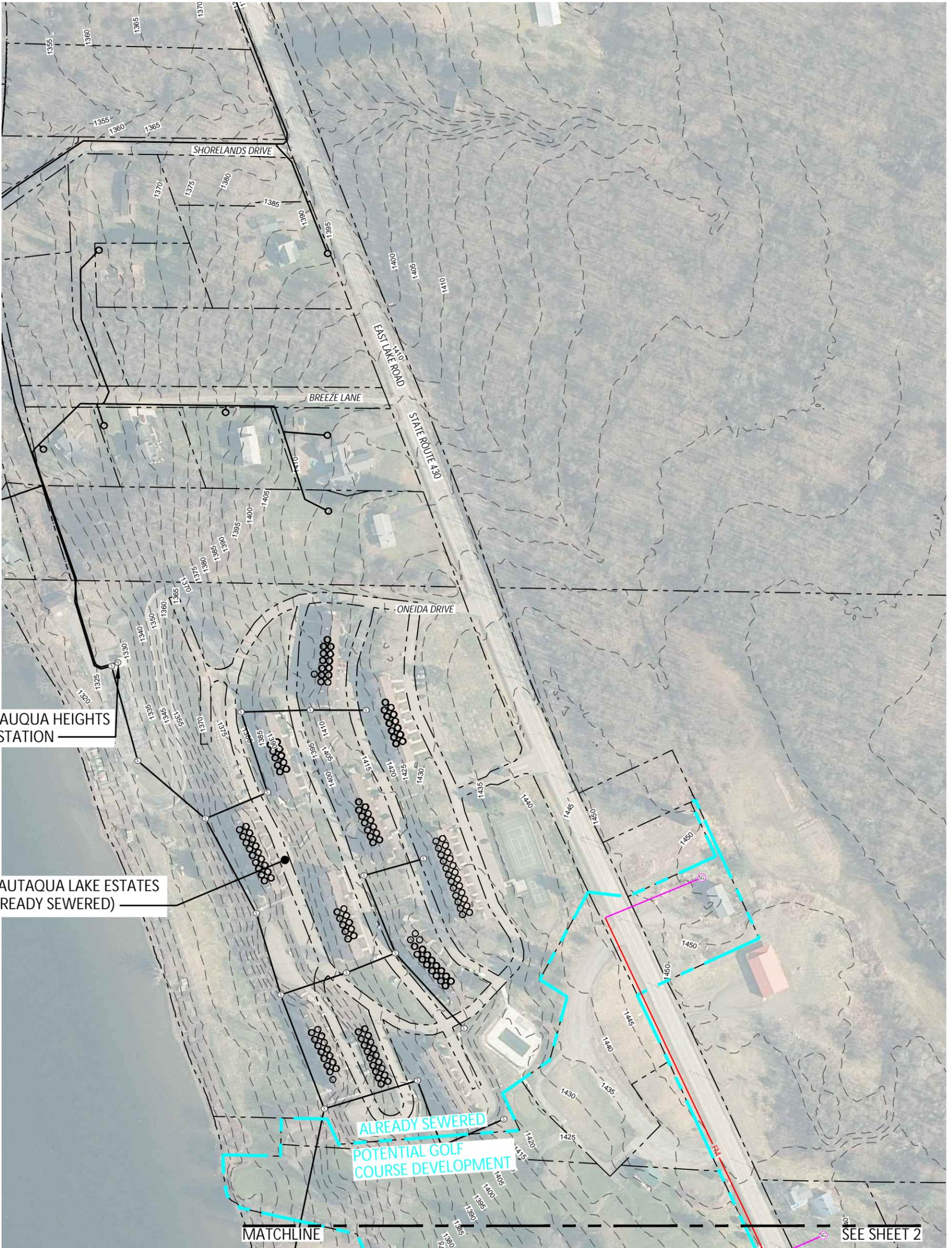
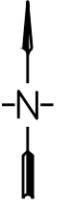


CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

SHEET INDEX

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Checked by: MJZ	Set: PRELIMINARY

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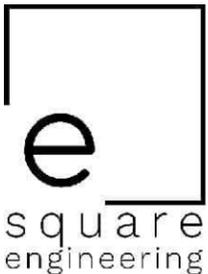
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PUMP STATION

CHAUTAQUA LAKE ESTATES
(ALREADY SEWERED)

ALREADY SEWERED
POTENTIAL GOLF COURSE DEVELOPMENT

MATCHLINE

SEE SHEET 2

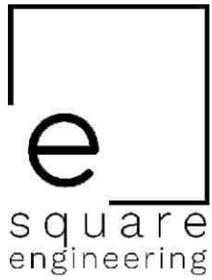
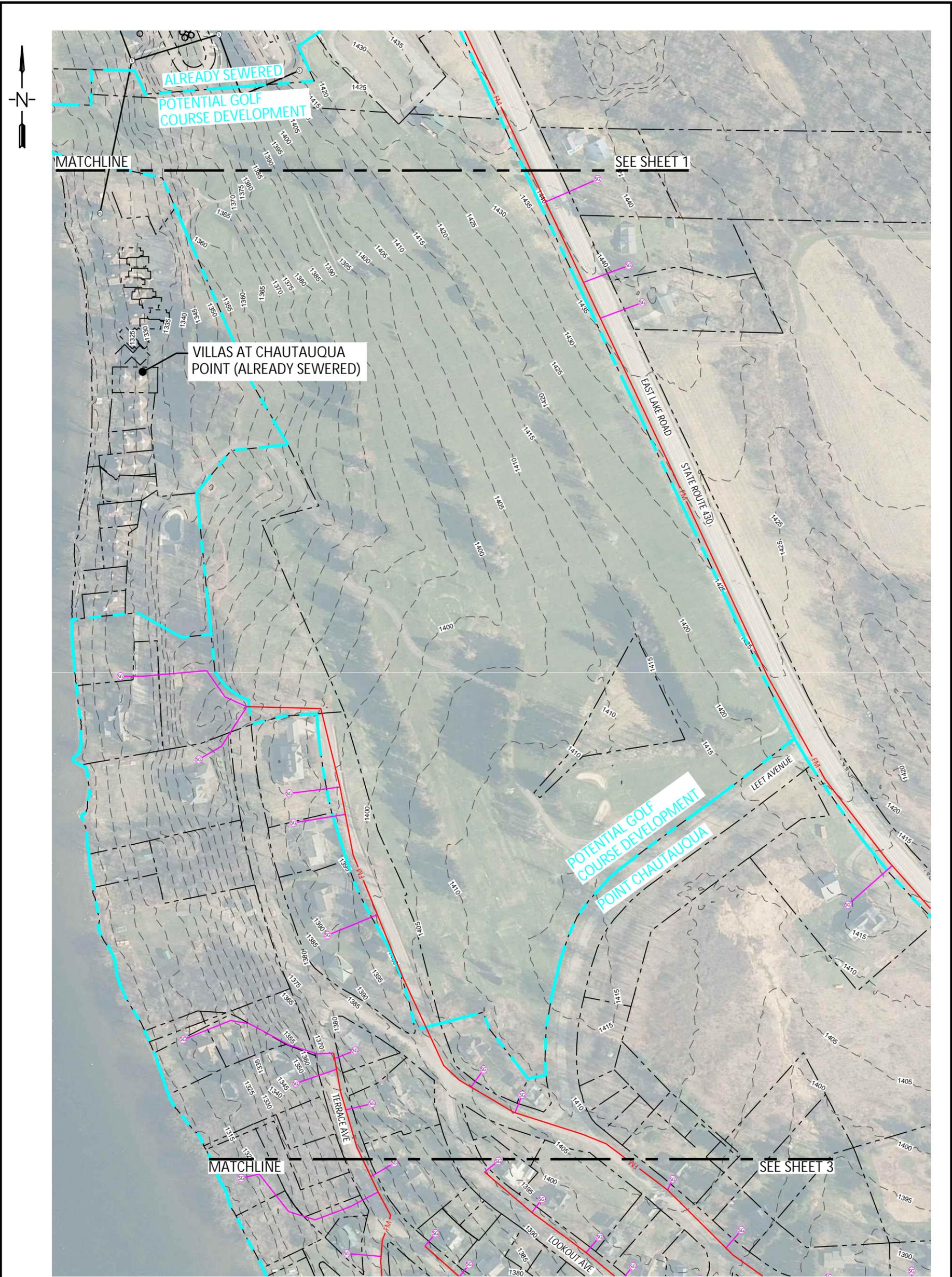


CHAUTAQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

EXISTING SEWER/NORTH CONNECTION LOCATION

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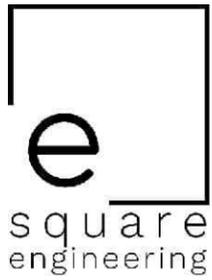
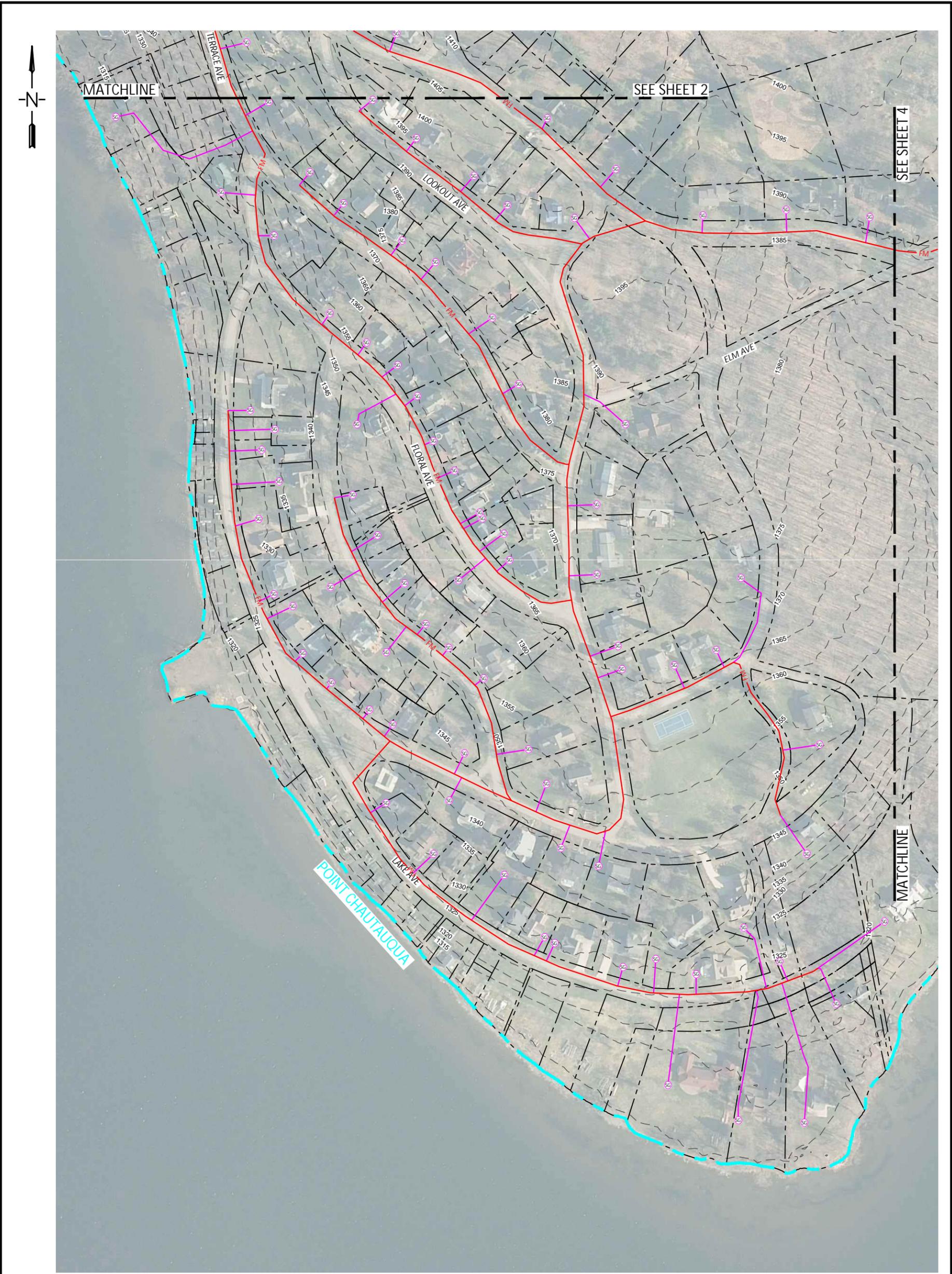


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

POTENTIAL GOLF COURSE DEVELOPMENT

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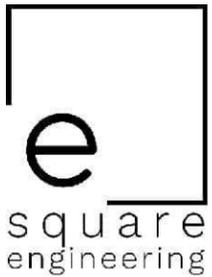
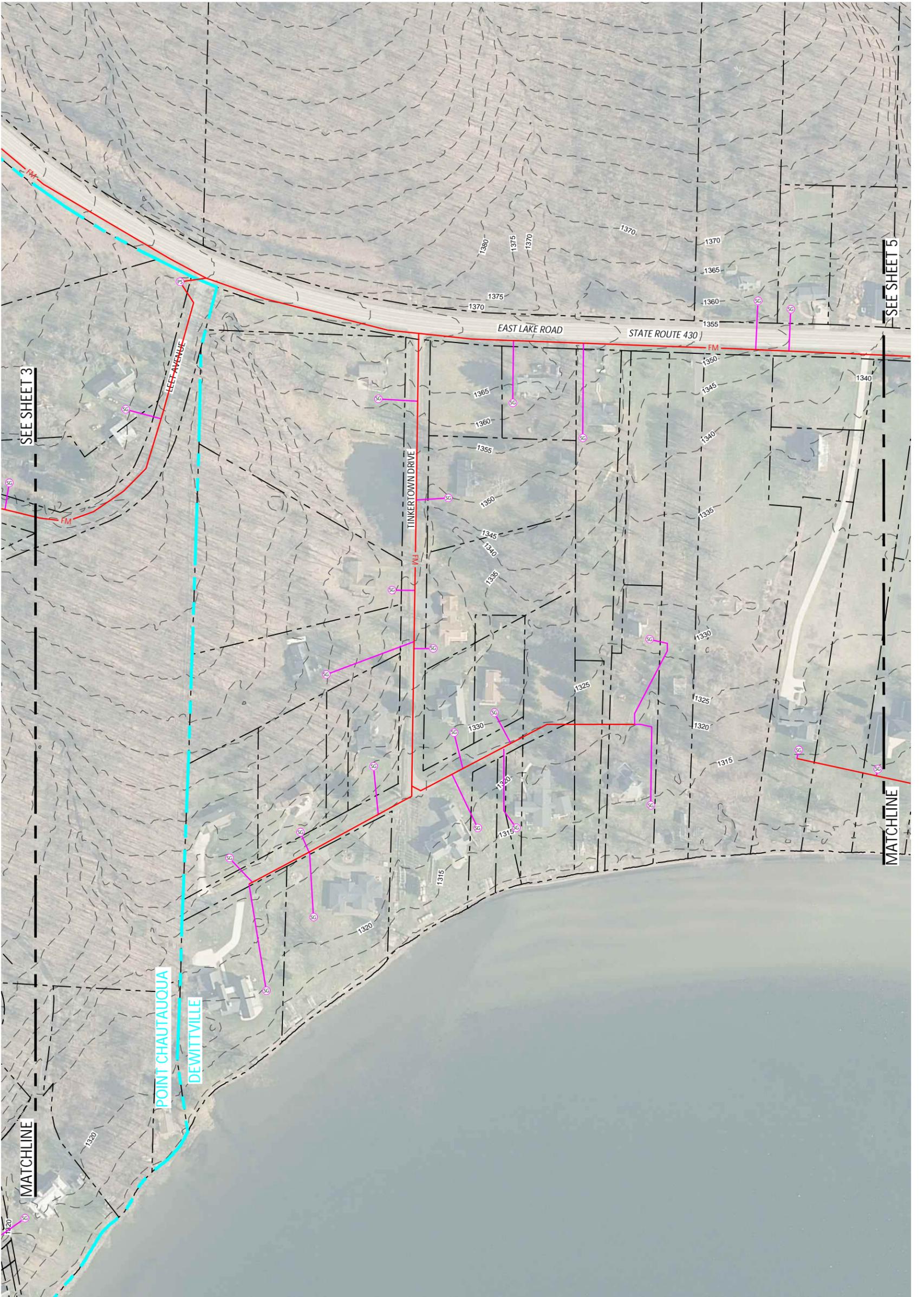
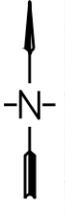
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
POINT CHAUTAUQUA

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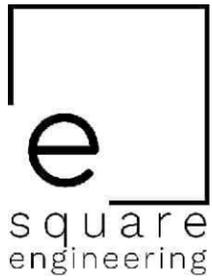
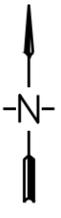
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
DEWITTVILLE

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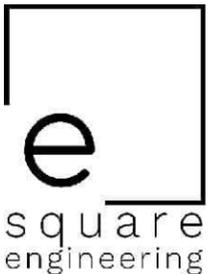
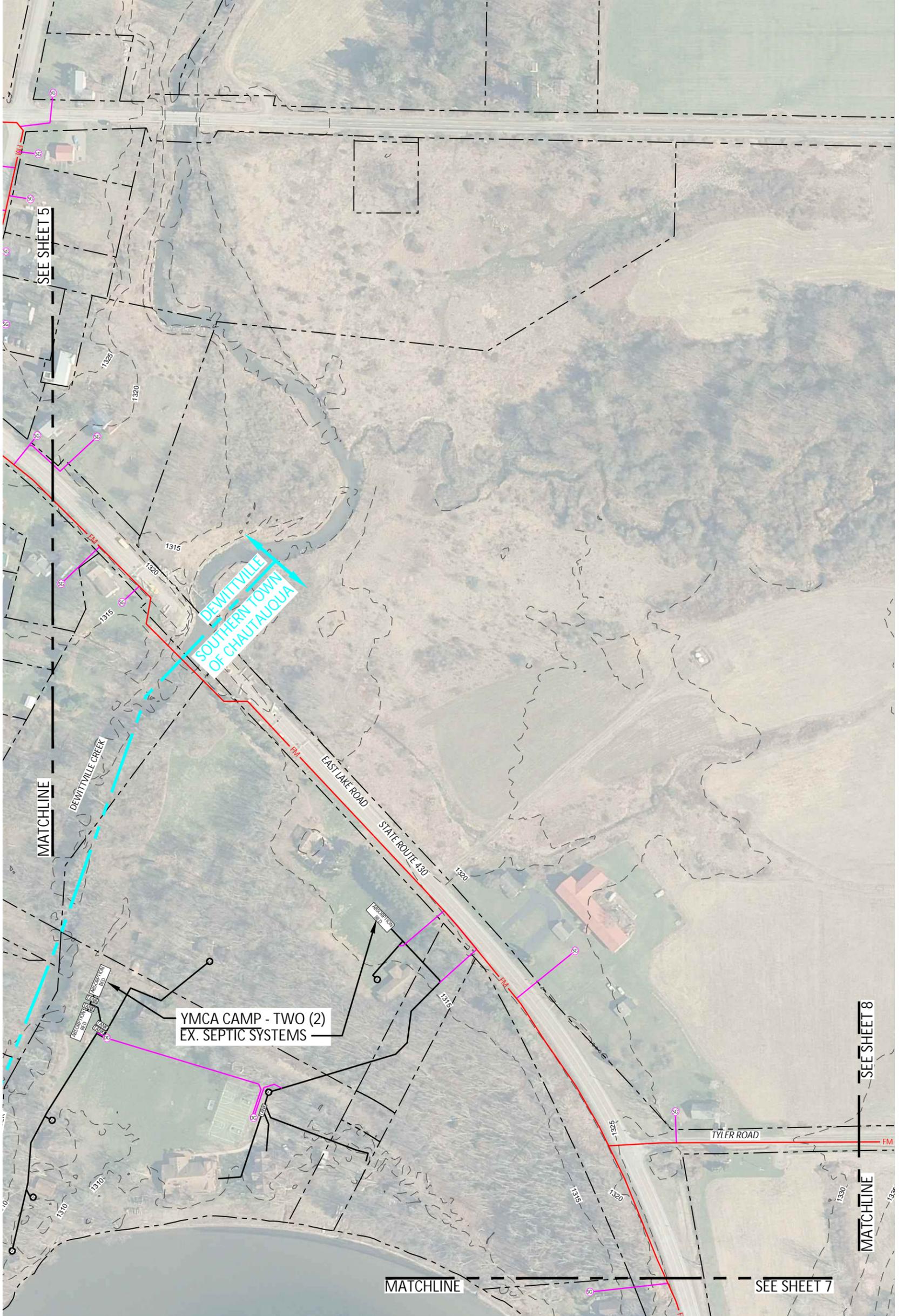
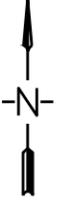
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
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 DEWITTVILLE**

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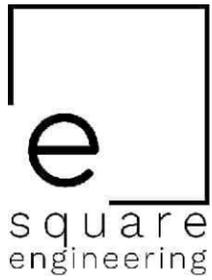
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
**YMCA CAMP / SOUTHERN
 TOWN OF CHAUTAUQUA**

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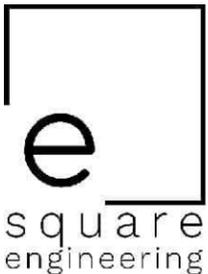
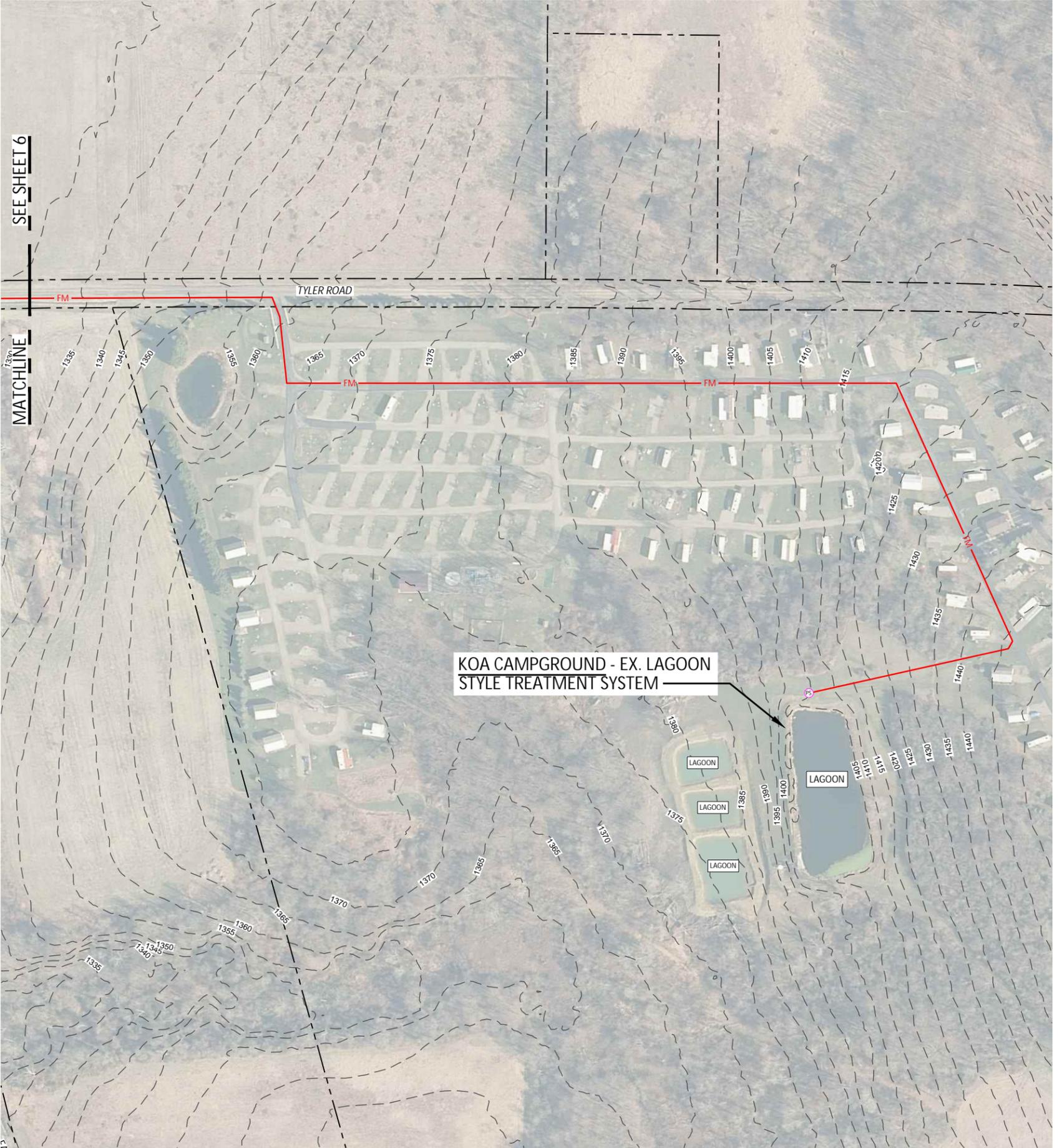
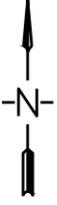


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

SOUTHERN TOWN OF CHAUTAUQUA

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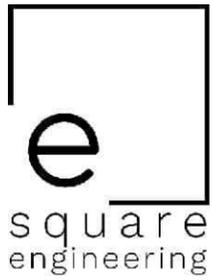
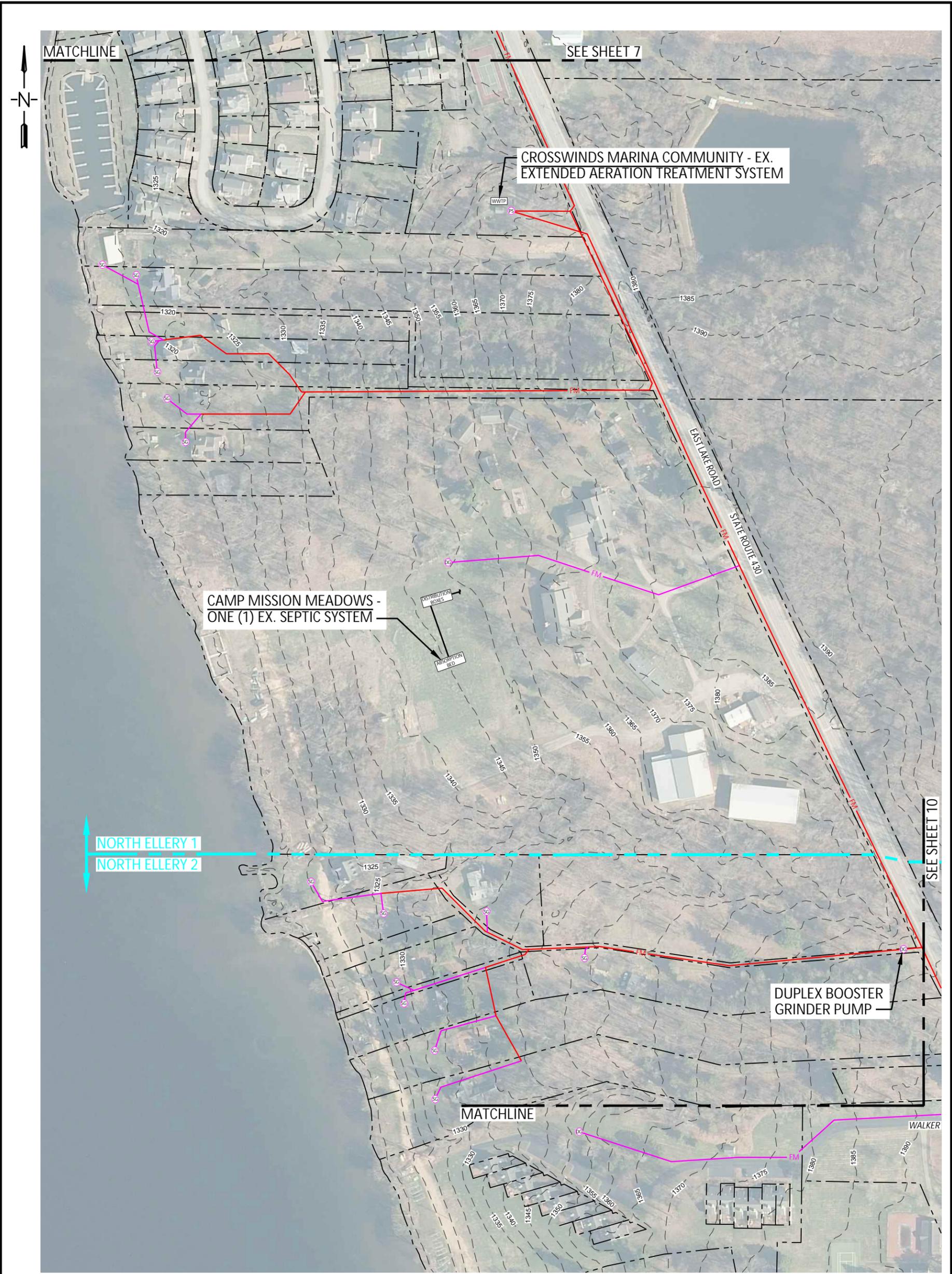
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
KOA CAMPGROUND

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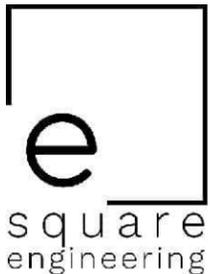
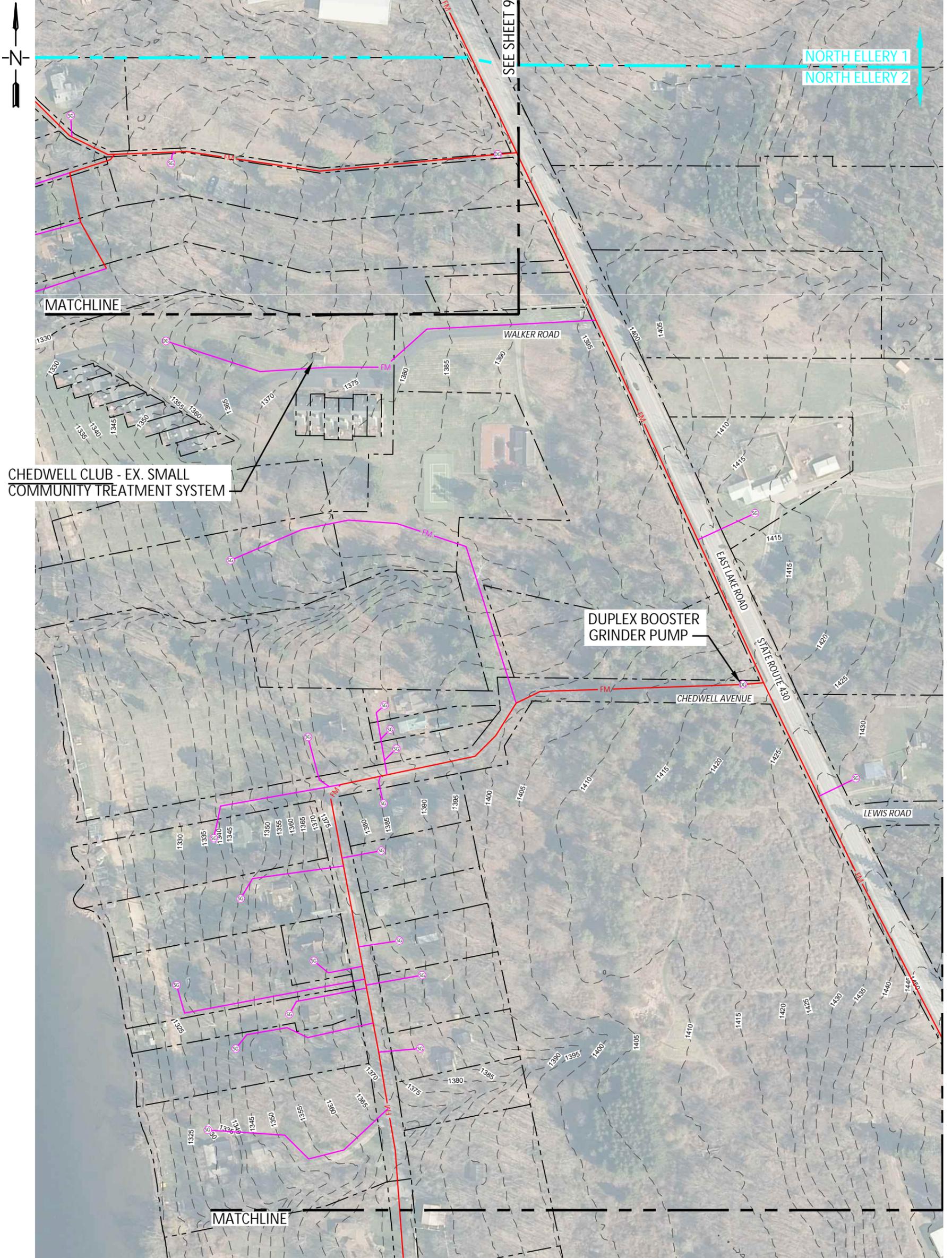


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 1 / CAMP MISSION MEADOWS

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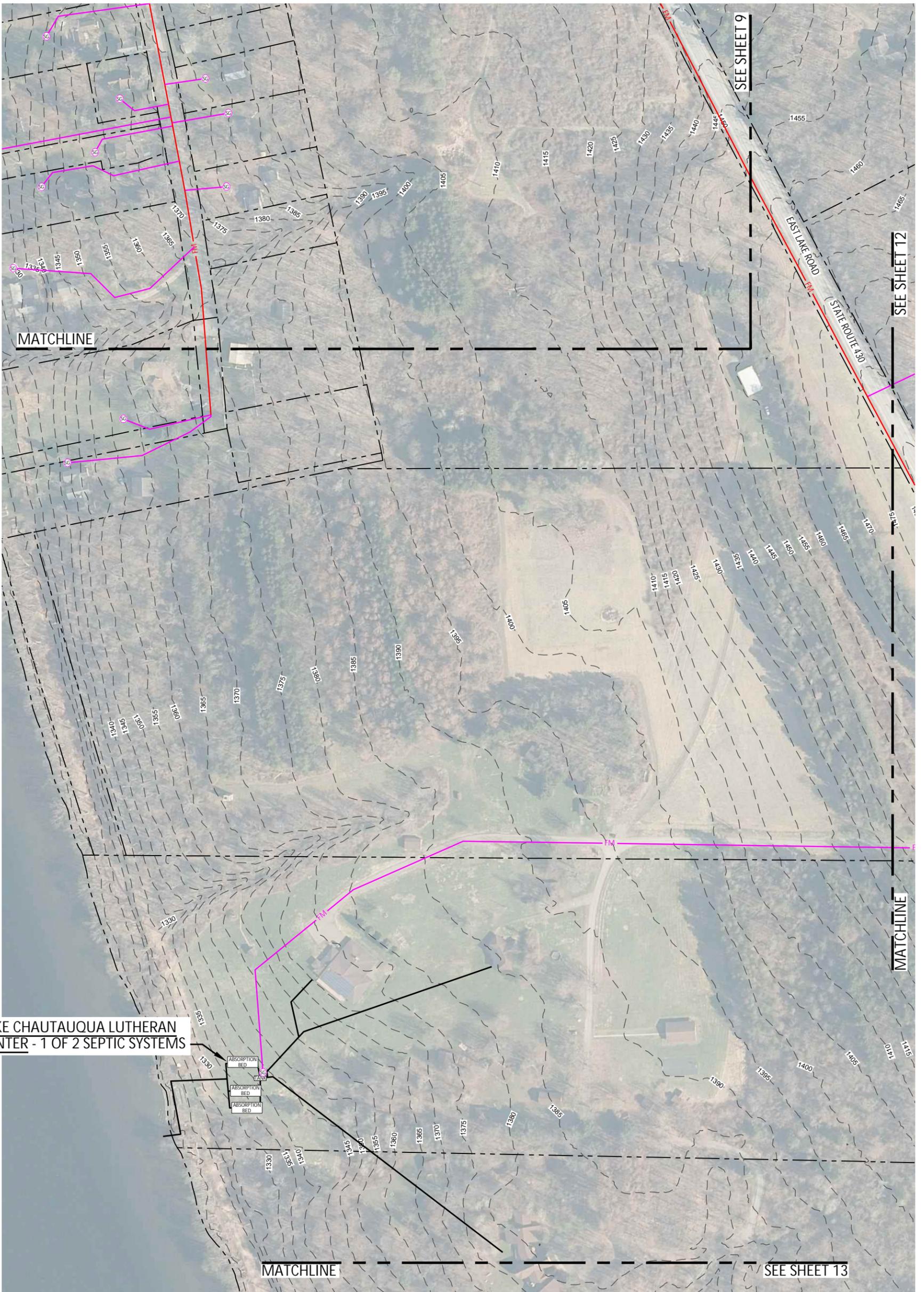
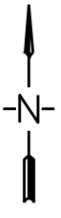


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 2 / CHEDWELL CLUB

Project No: 125.001	Date: NOVEMBER 2024
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MATCHLINE

SEE SHEET 9

SEE SHEET 12

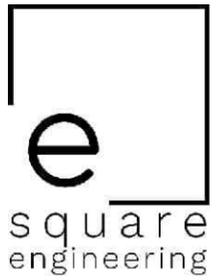
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LAKE CHAUTAUQUA LUTHERAN CENTER - 1 OF 2 SEPTIC SYSTEMS



MATCHLINE

SEE SHEET 13

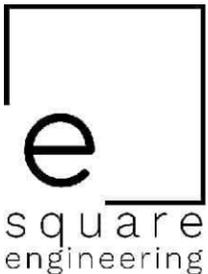
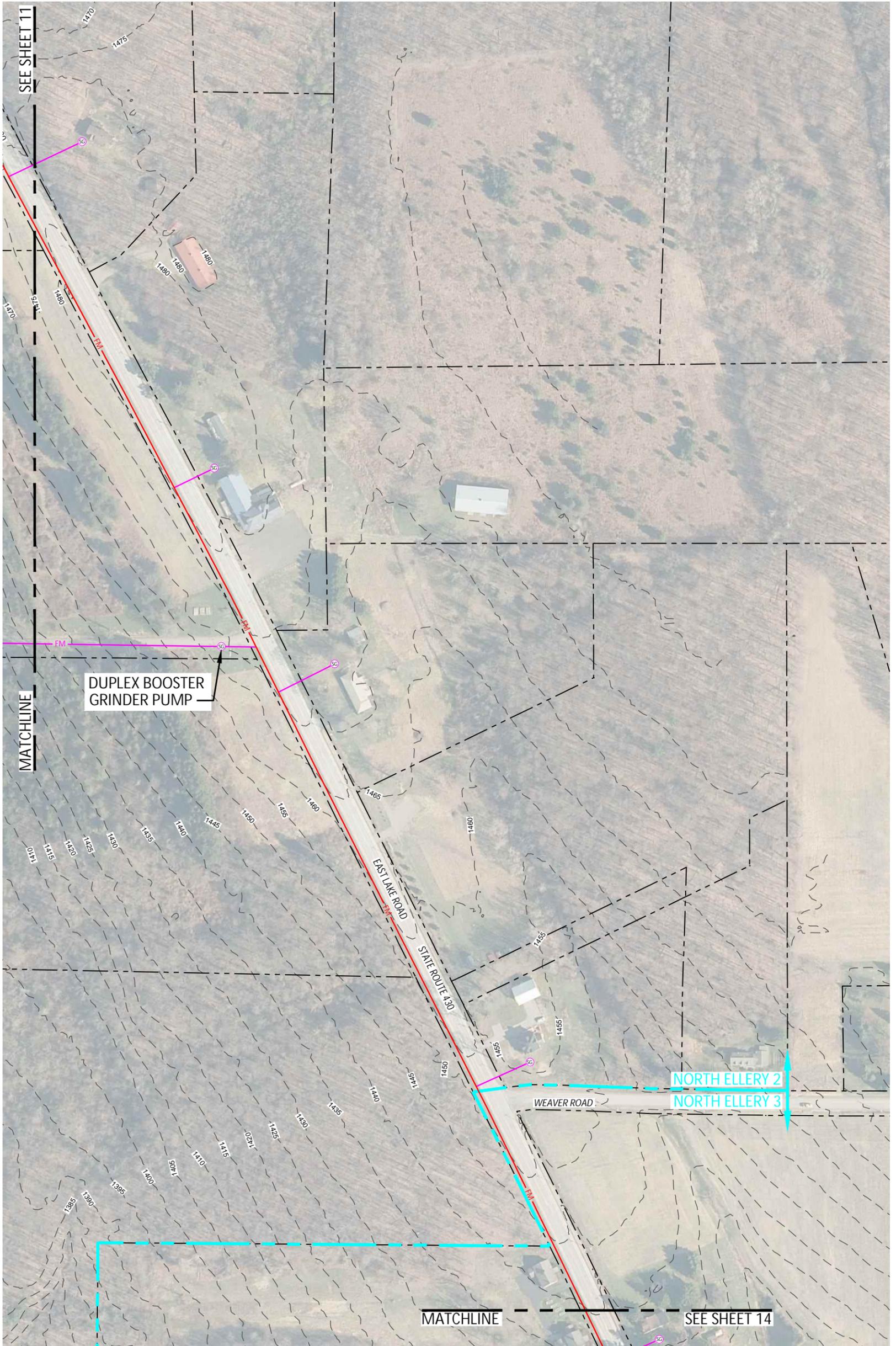
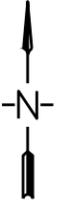


CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 2 / LUTHERAN CENTER

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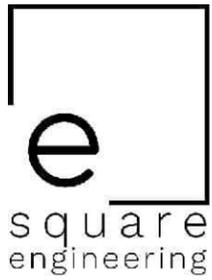
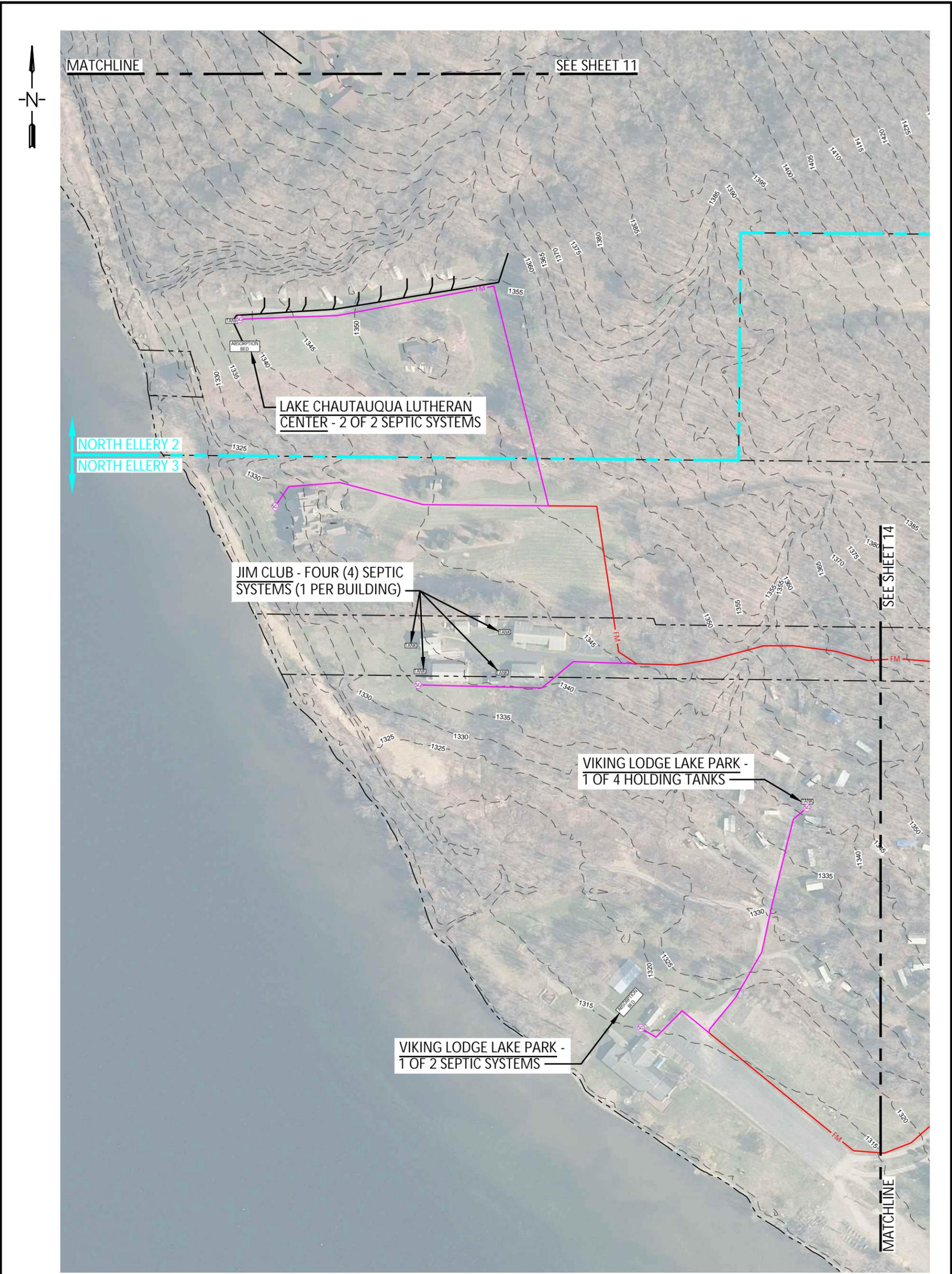
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 2

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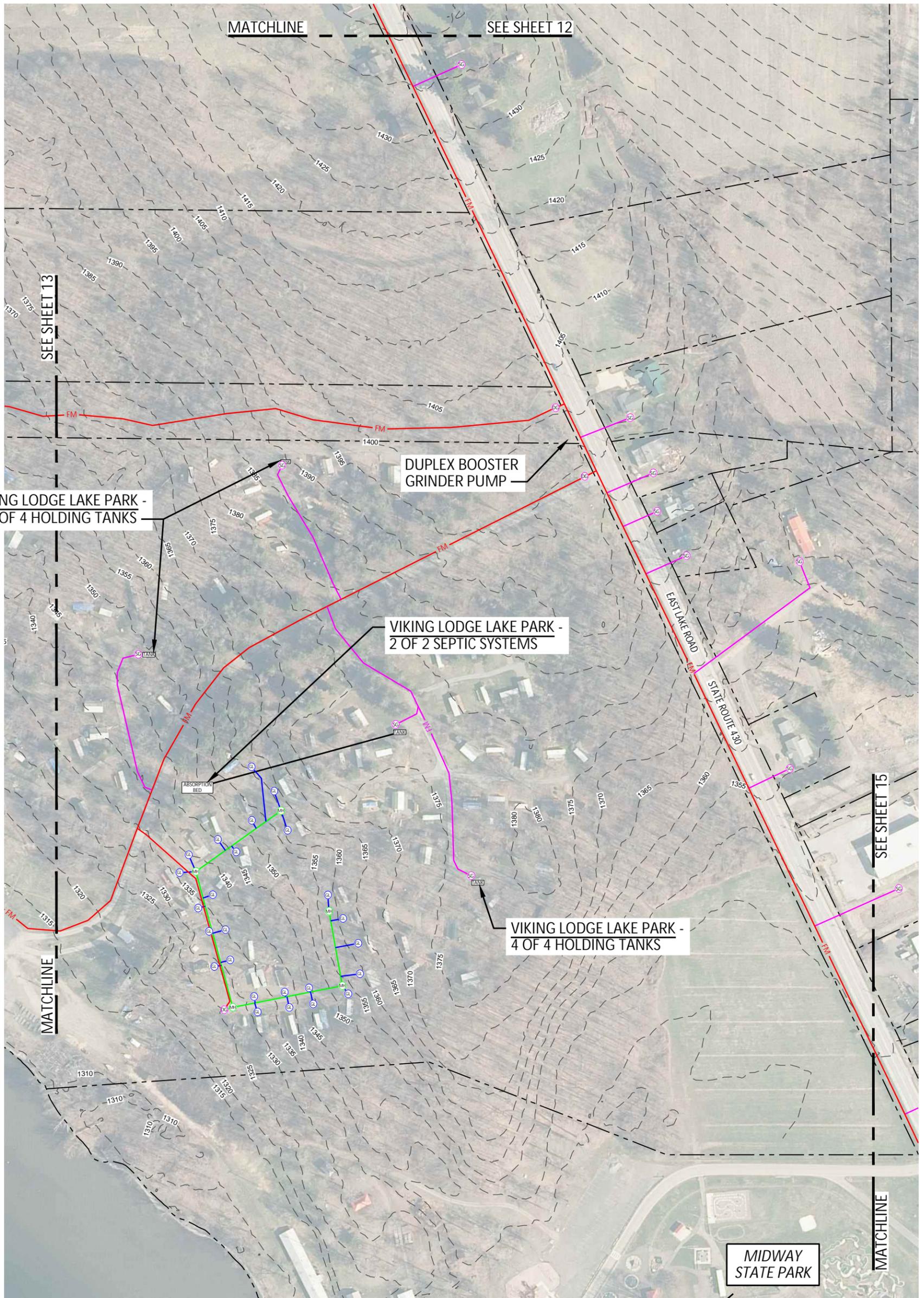
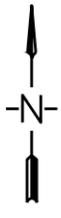


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

**NORTH ELLERY 3 / JIM CLUB
 / VIKING LODGE LAKE PARK**

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VIKING LODGE LAKE PARK -
2/3 OF 4 HOLDING TANKS

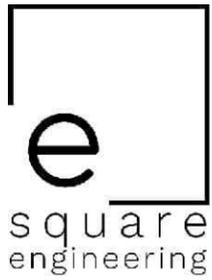
DUPLEX BOOSTER
GRINDER PUMP

VIKING LODGE LAKE PARK -
2 OF 2 SEPTIC SYSTEMS

VIKING LODGE LAKE PARK -
4 OF 4 HOLDING TANKS

ABSORPTION
BED

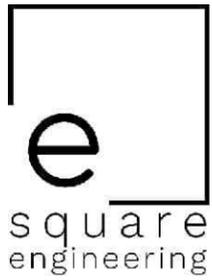
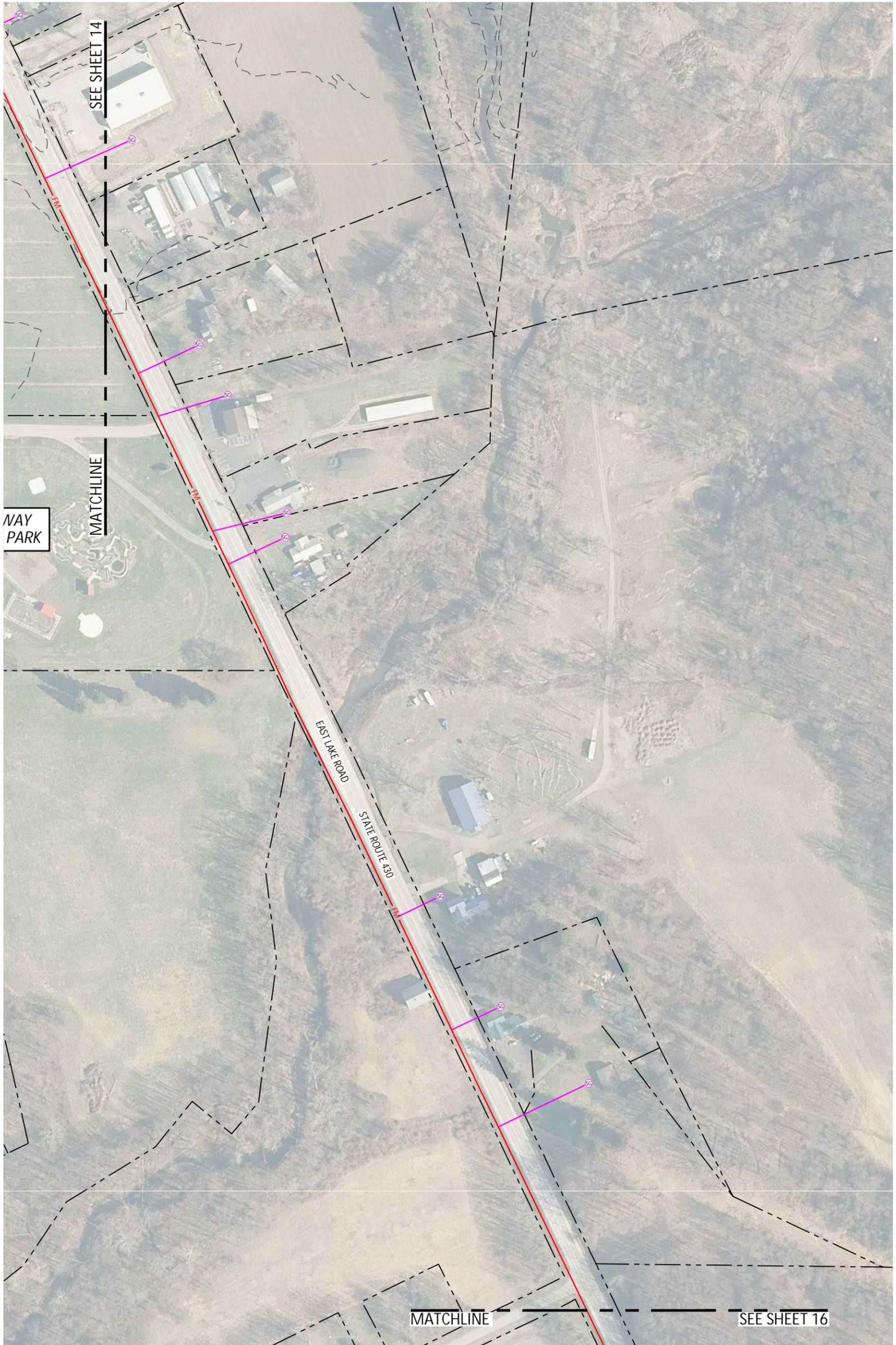
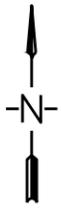
MIDWAY
STATE PARK



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
**NORTH ELLERY 3 /
VIKING LODGE LAKE PARK**

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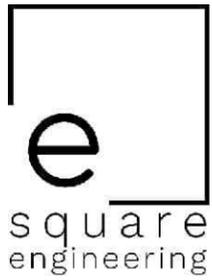
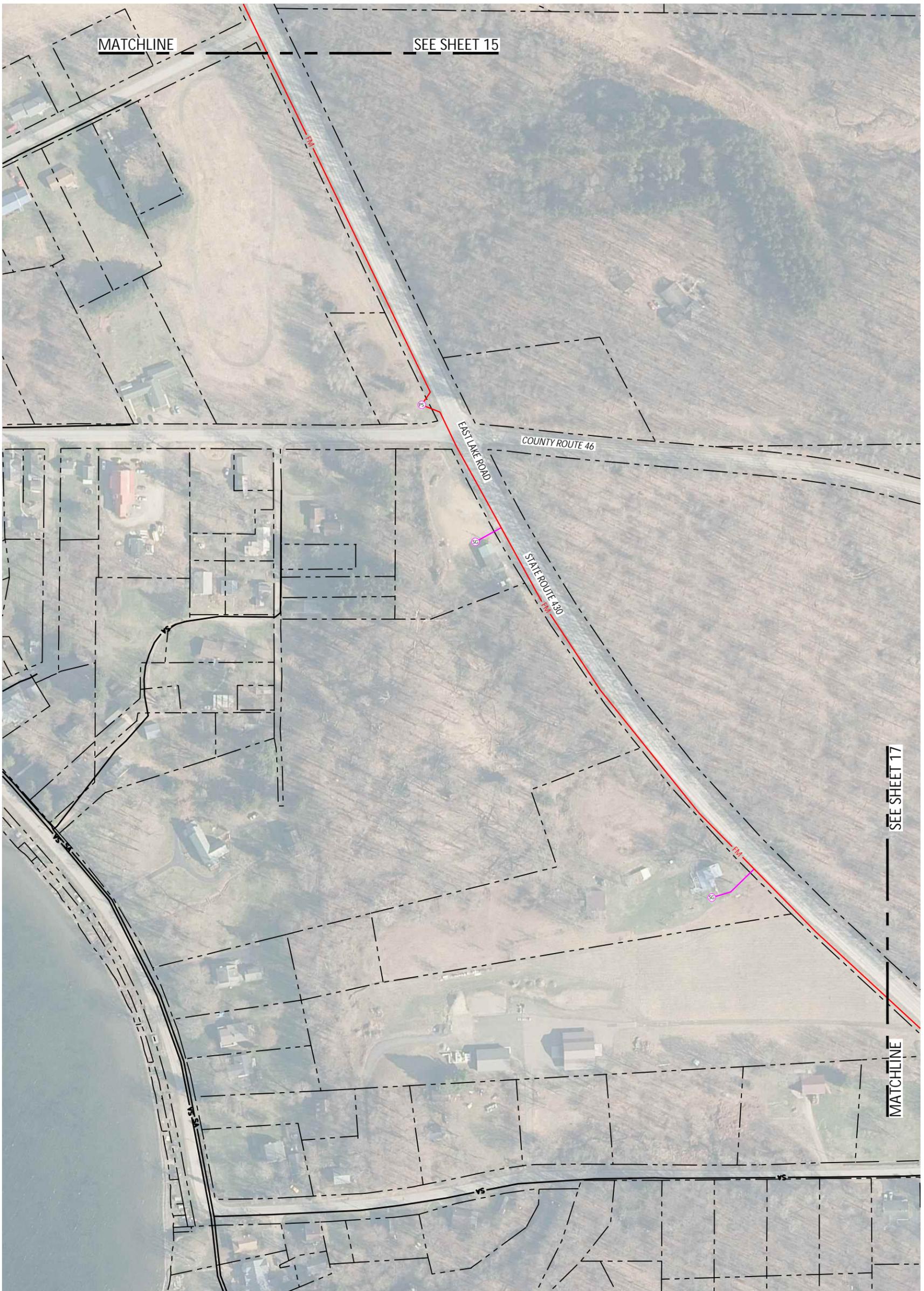
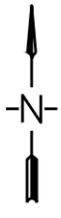
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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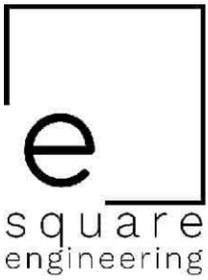
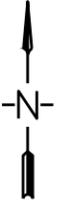


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE

NORTH ELLERY 3

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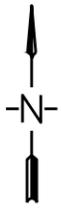
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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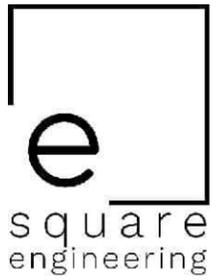


MATCHLINE

SEE SHEET 17

MATCHLINE

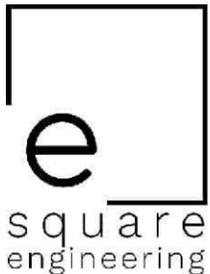
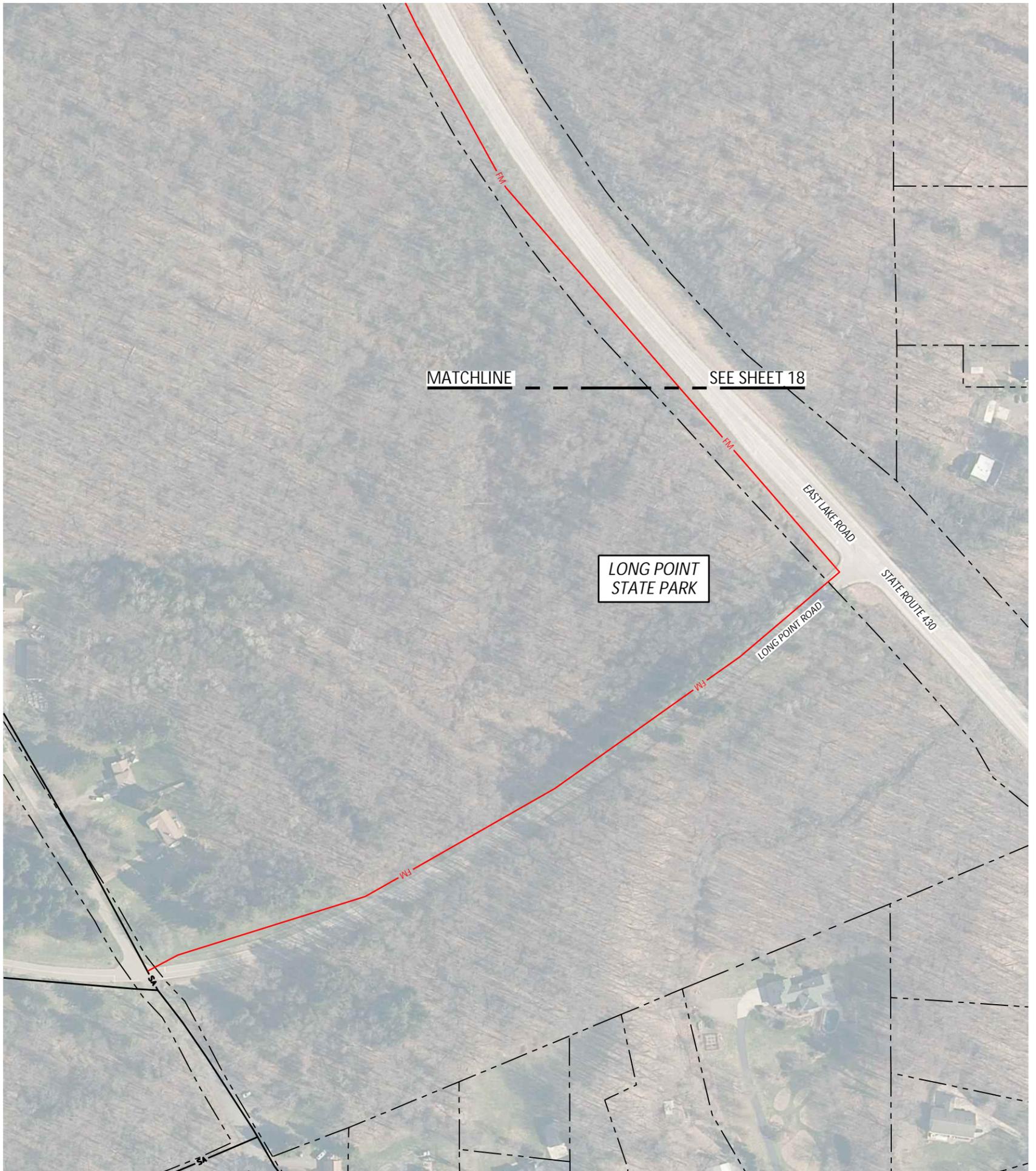
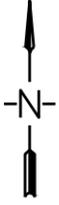
SEE SHEET 19



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - WITH GOLF COURSE
NORTH ELLERY 3

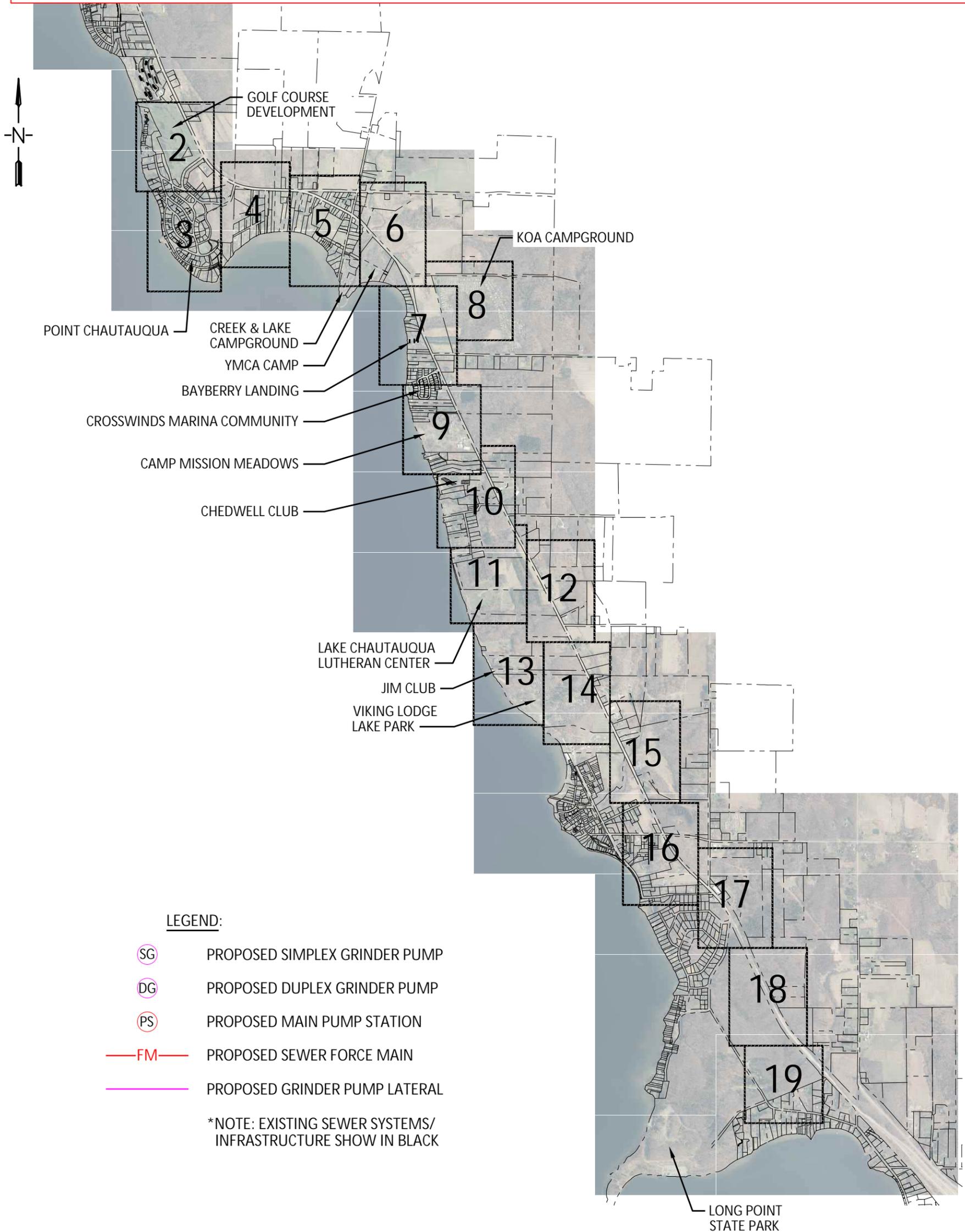
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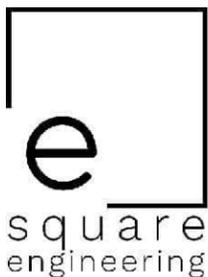
Appendix P

Low-Pressure Collection System – Option 2 – Preliminary Layout

**COLLECTION SYSTEM ALTERNATIVE NO. 2 - LOW-PRESSURE COLLECTION SYSTEM
 OPTION NO. 2 - CONVEYANCE SCCLSD WWTP (WITHOUT GOLF COURSE DEVELOPMENT)
 PRELIMINARY COLLECTION SYSTEM LAYOUT**



Note: Layouts are preliminary and are largely utilized for estimating quantities of piping required. Size and locations of infrastructure subject to change and shall be verified design engineer during final project design.

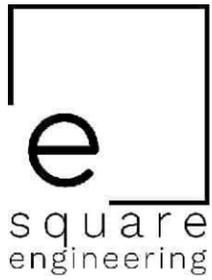
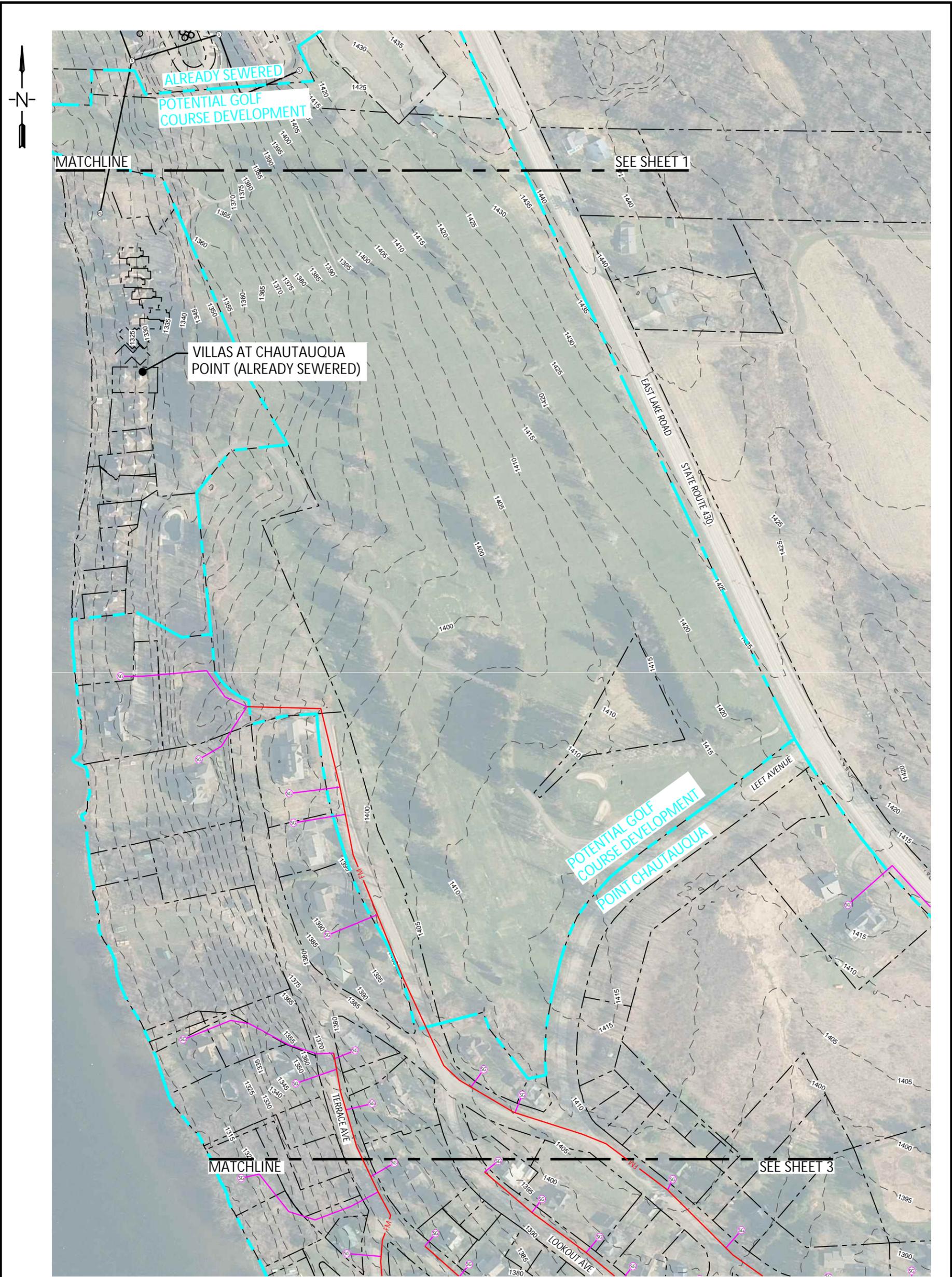


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

SHEET INDEX

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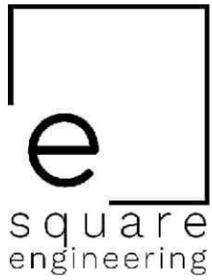
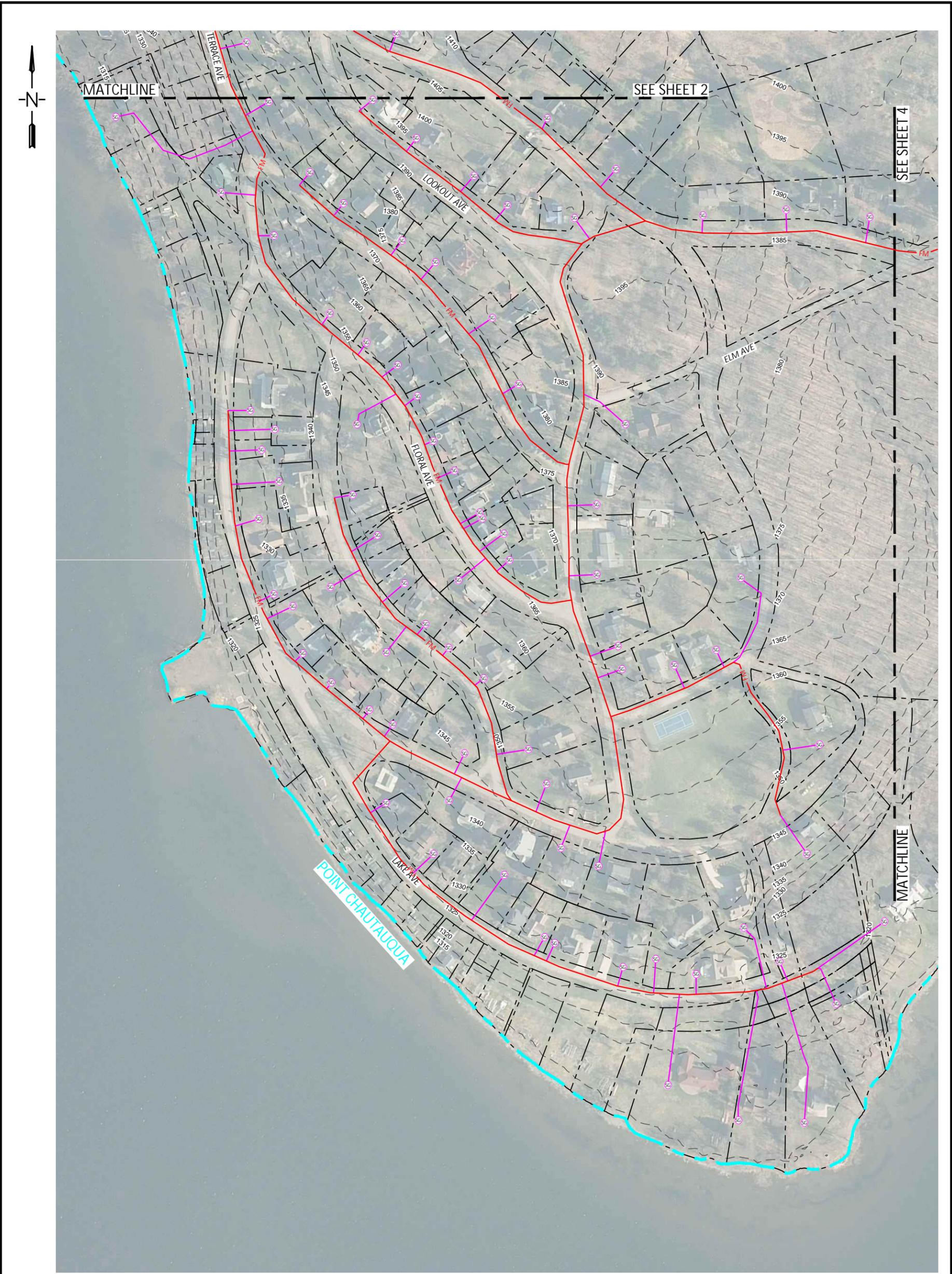


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

POTENTIAL GOLF COURSE DEVELOPMENT

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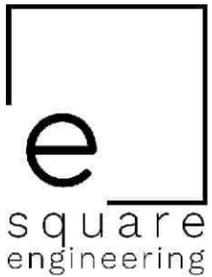
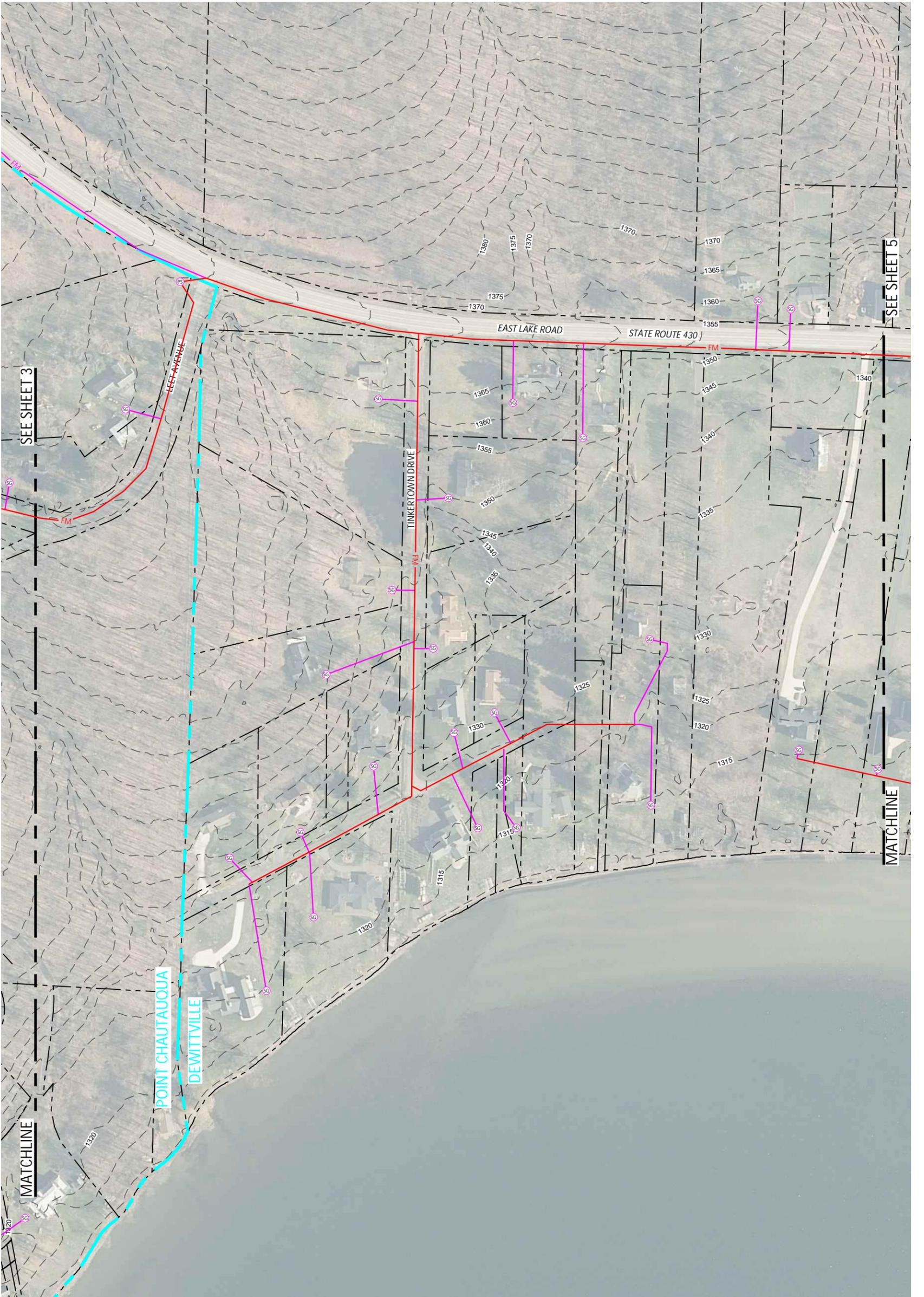
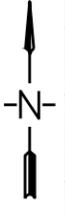
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
POINT CHAUTAUQUA

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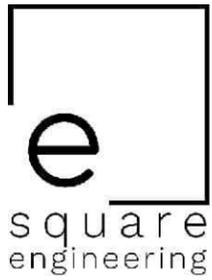
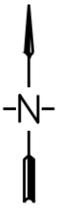
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
DEWITTVILLE

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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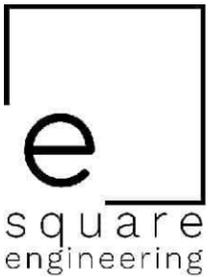
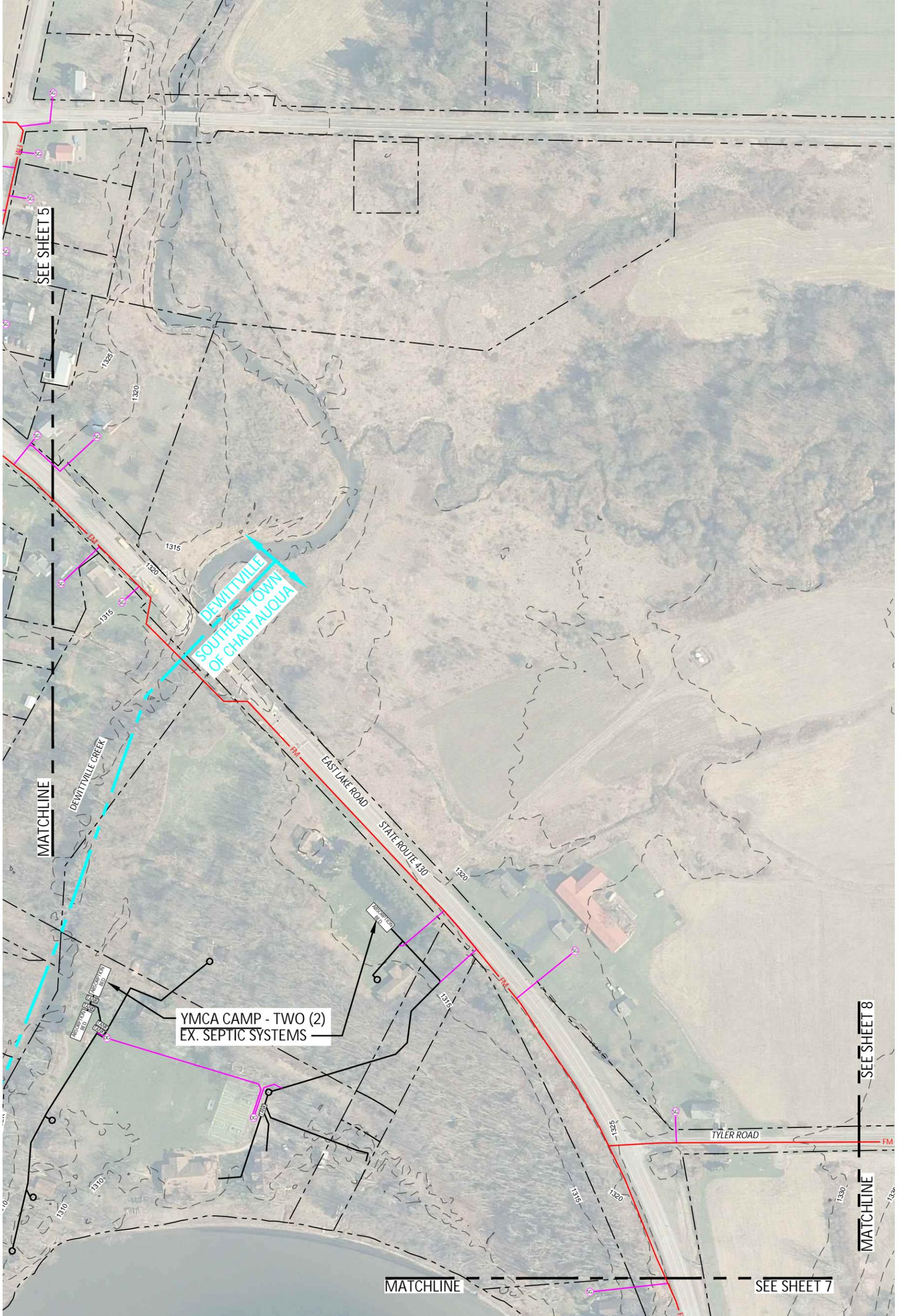
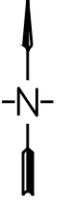
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
**CREEK & LAKE CAMPGROUND /
 DEWITTVILLE**

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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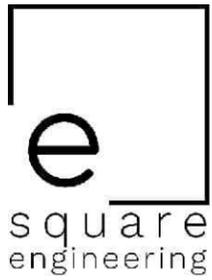
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
**YMCA CAMP / SOUTHERN
 TOWN OF CHAUTAUQUA**

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
Checked by: MJZ	Set: PRELIMINARY

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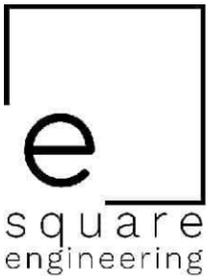
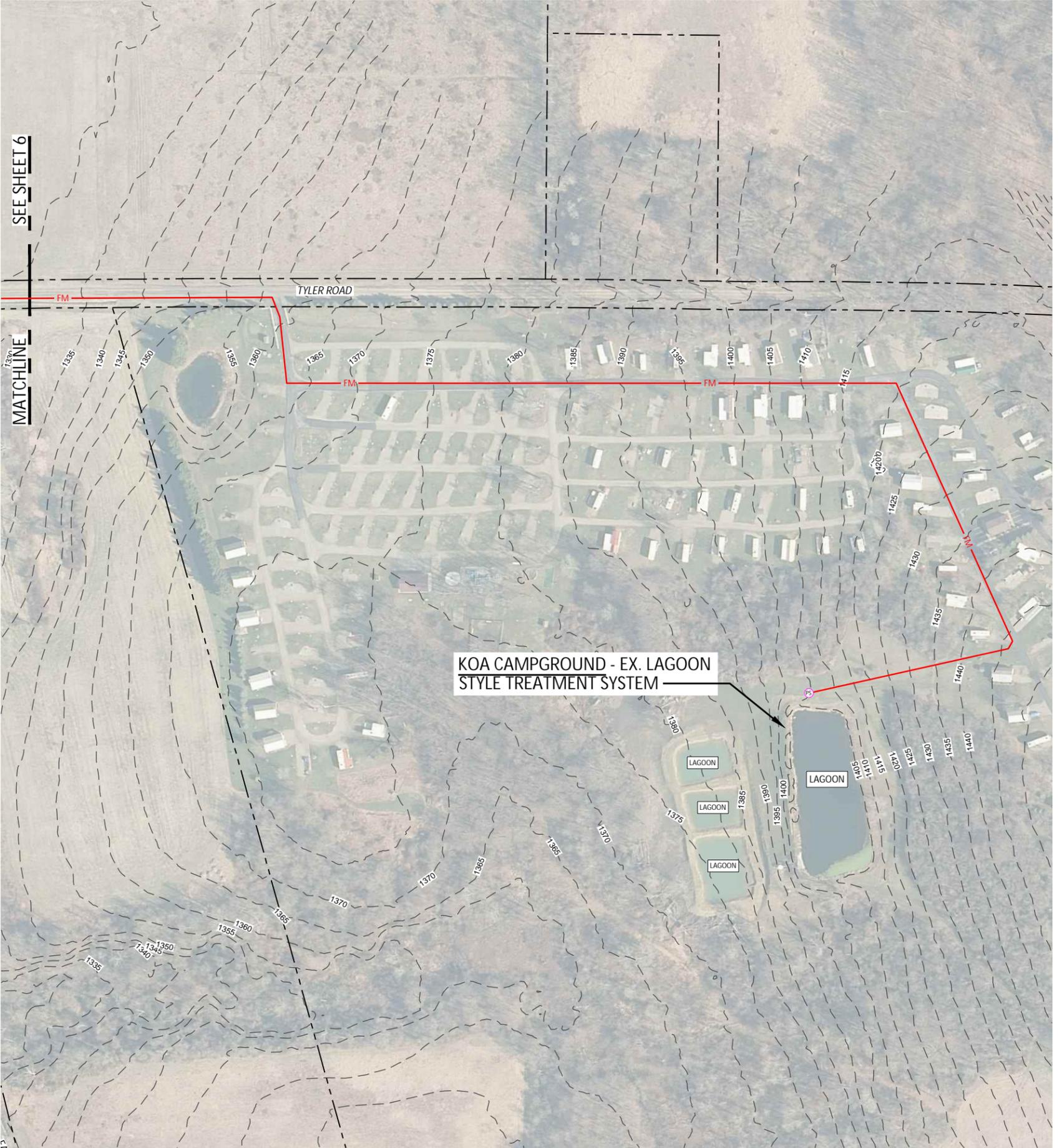
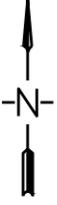


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

SOUTHERN TOWN OF CHAUTAUQUA

Project No: 125.001	Date: NOVEMBER 2024
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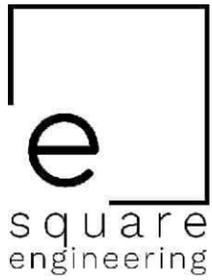
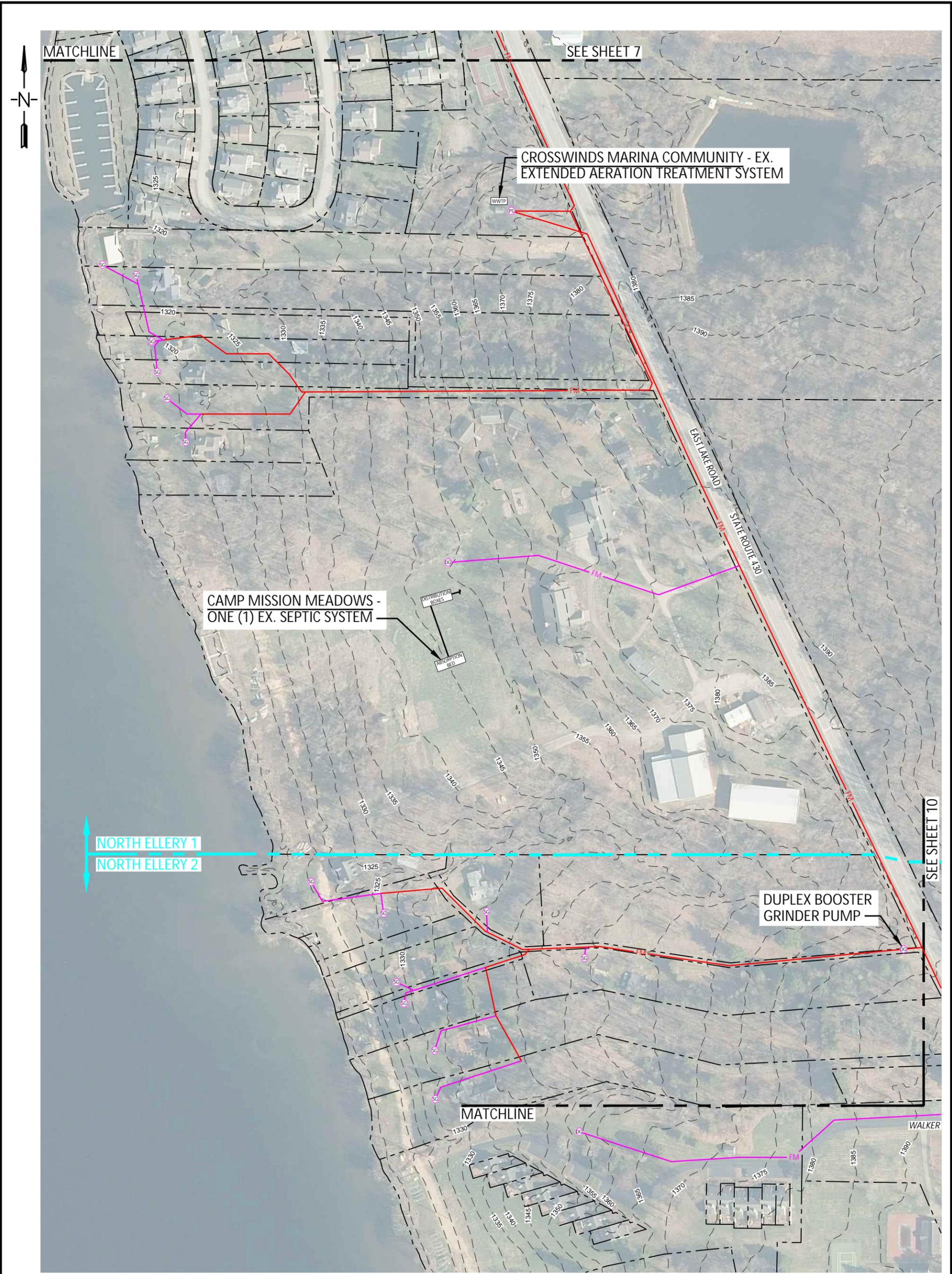
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
KOA CAMPGROUND

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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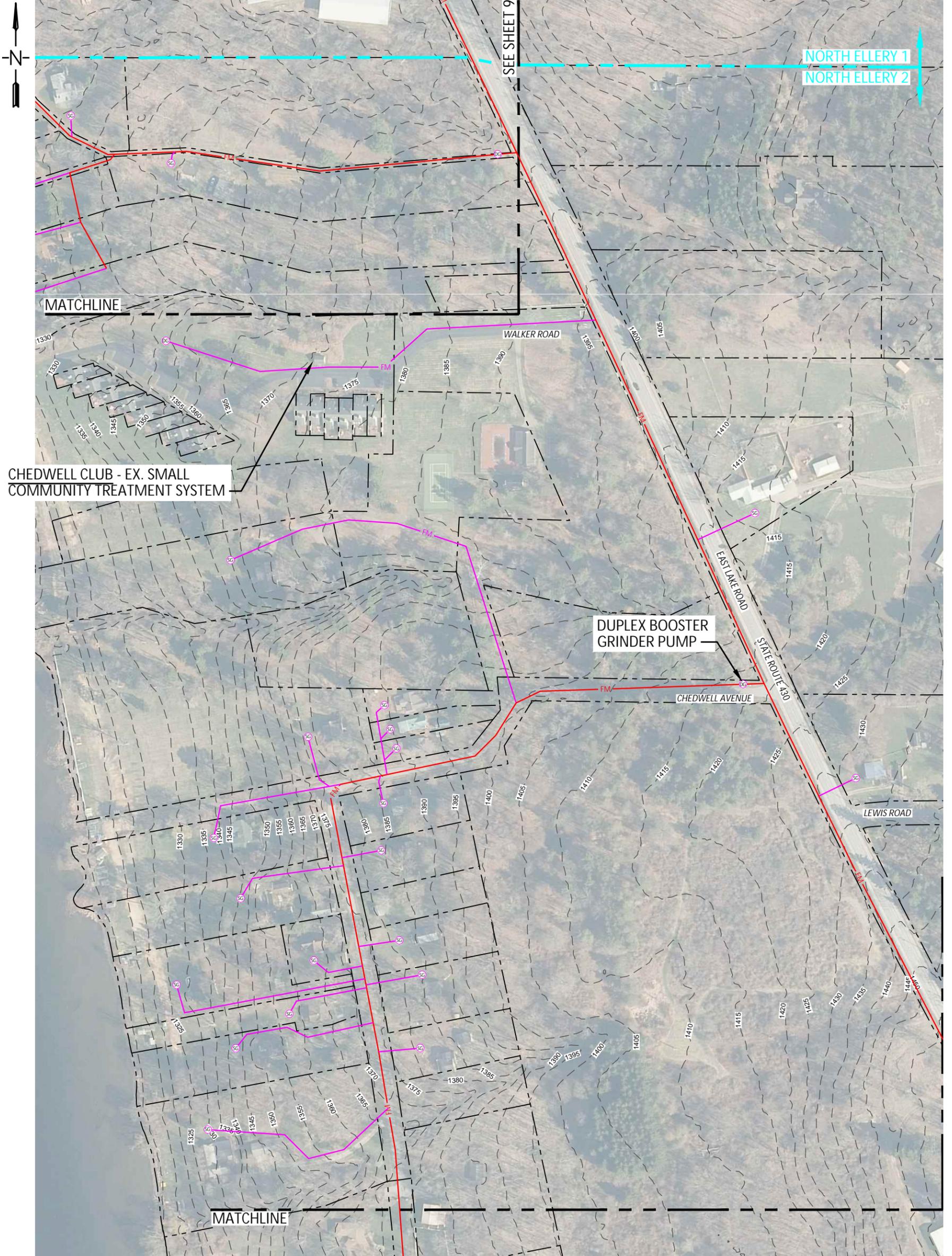


CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

NORTH ELLERY 1 / CAMP MISSION MEADOWS

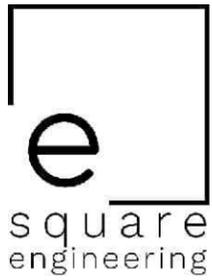
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CHEDWELL CLUB - EX. SMALL
COMMUNITY TREATMENT SYSTEM

DUPLEX BOOSTER
GRINDER PUMP

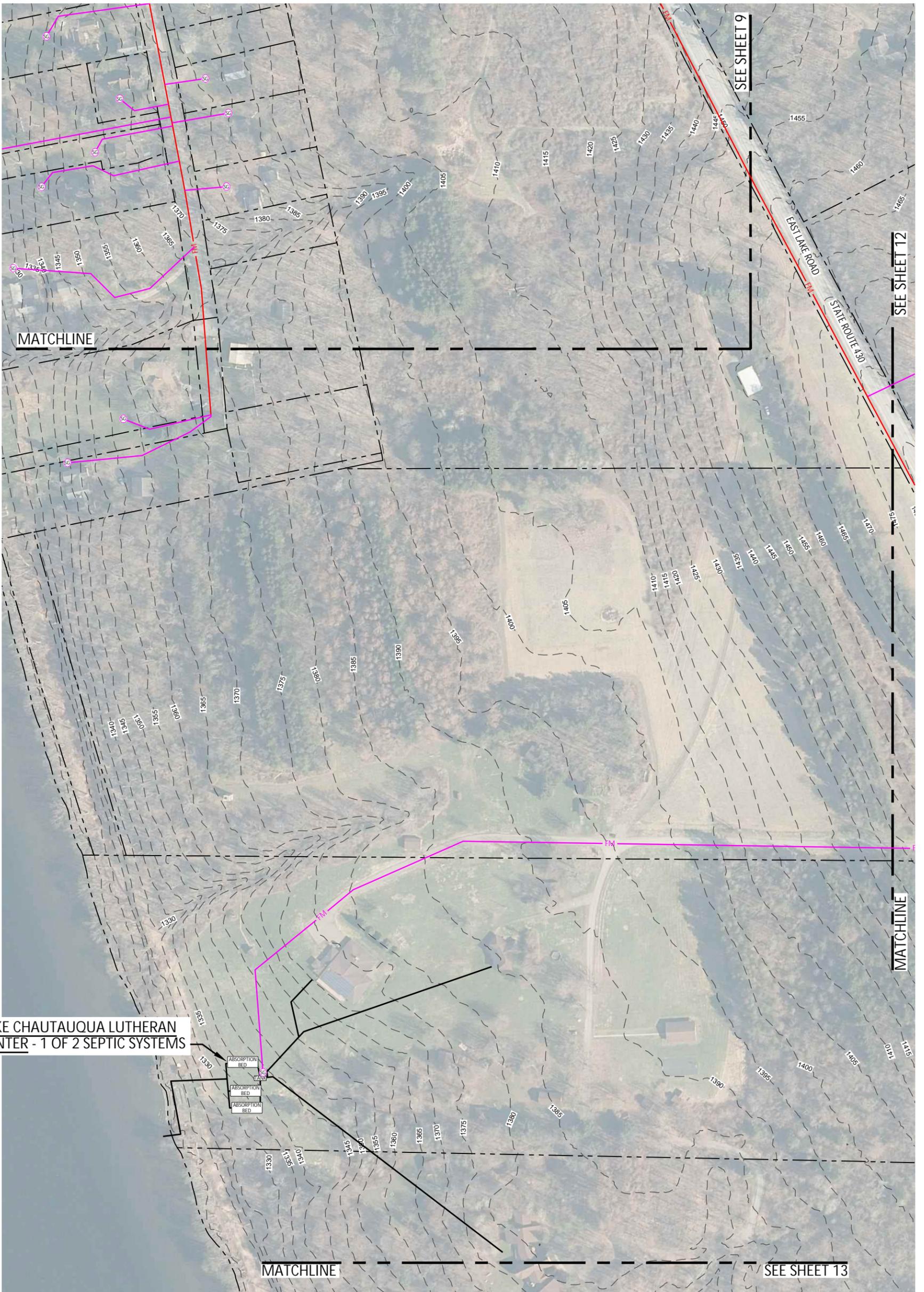
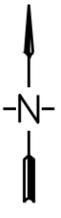


CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

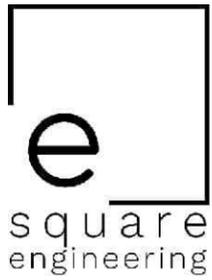
**NORTH ELLERY 2 /
CHEDWELL CLUB**

Project No: 125.001	Date: NOVEMBER 2024
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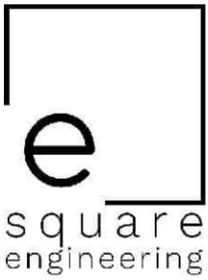
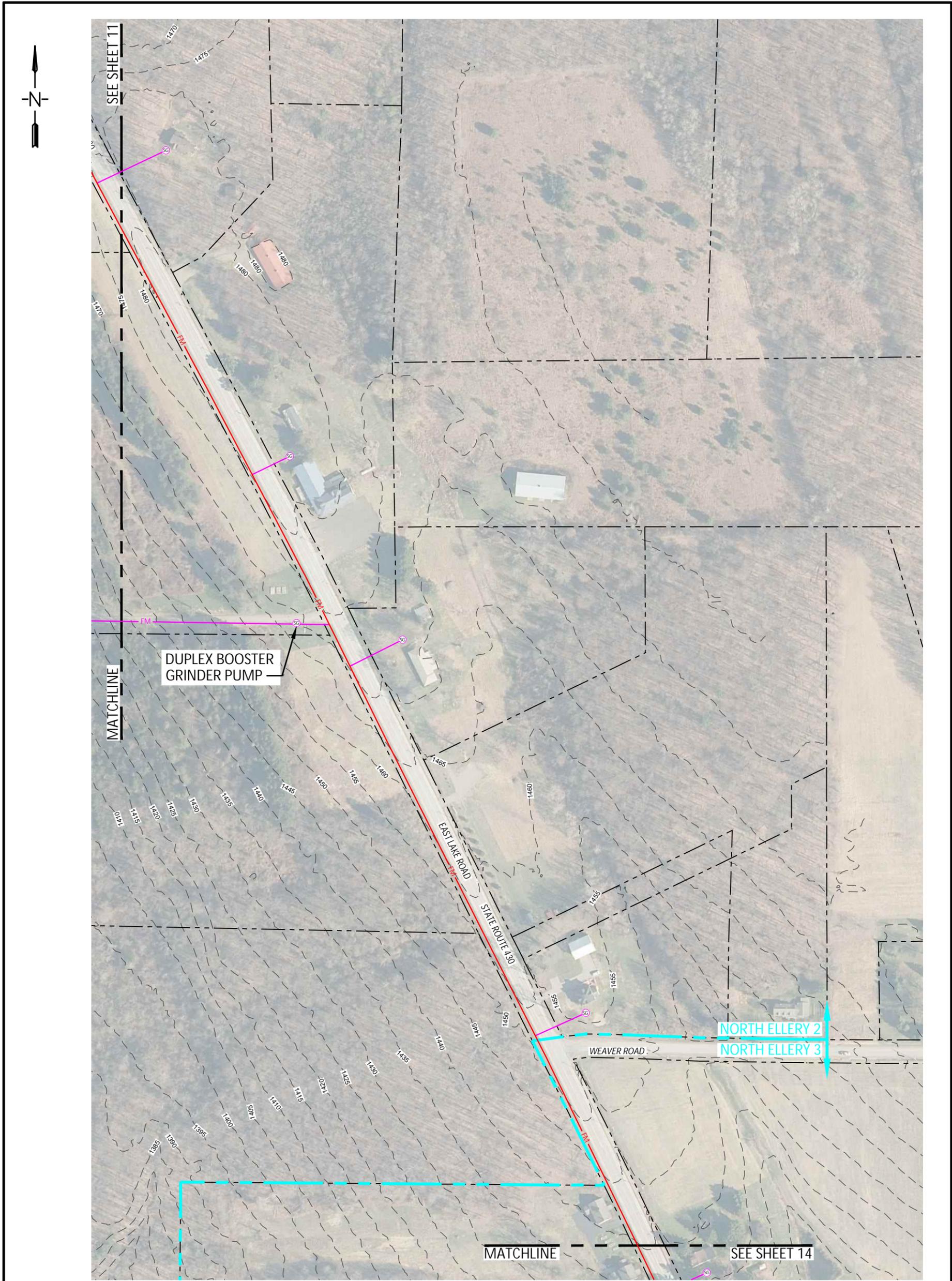
LAKE CHAUTAUQUA LUTHERAN CENTER - 1 OF 2 SEPTIC SYSTEMS



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 2 /
LUTHERAN CENTER**

Project No: 125.001	Date: NOVEMBER 2024
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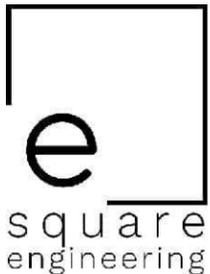
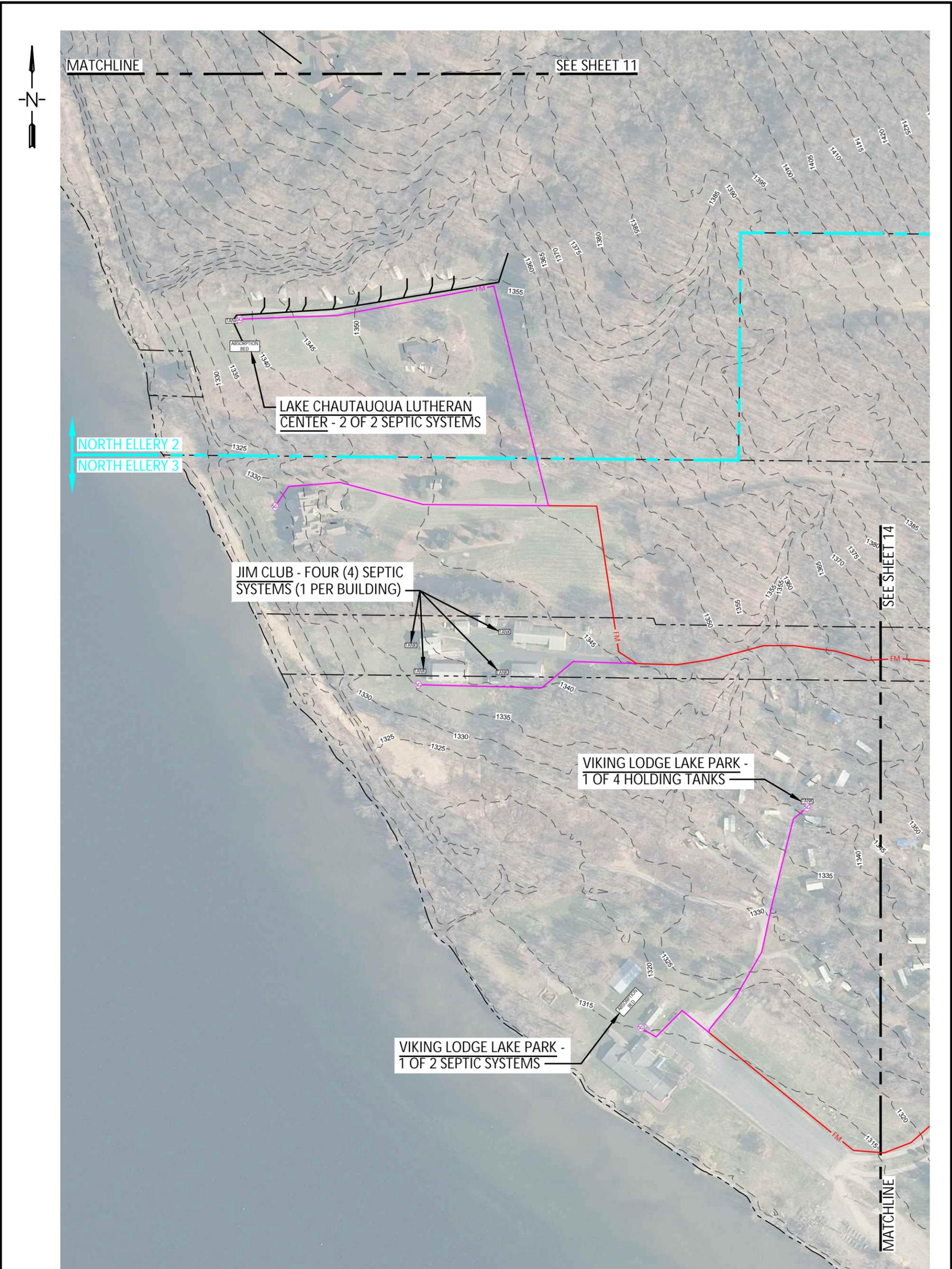
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 2

Project No: 125.001	Date: NOVEMBER 2024
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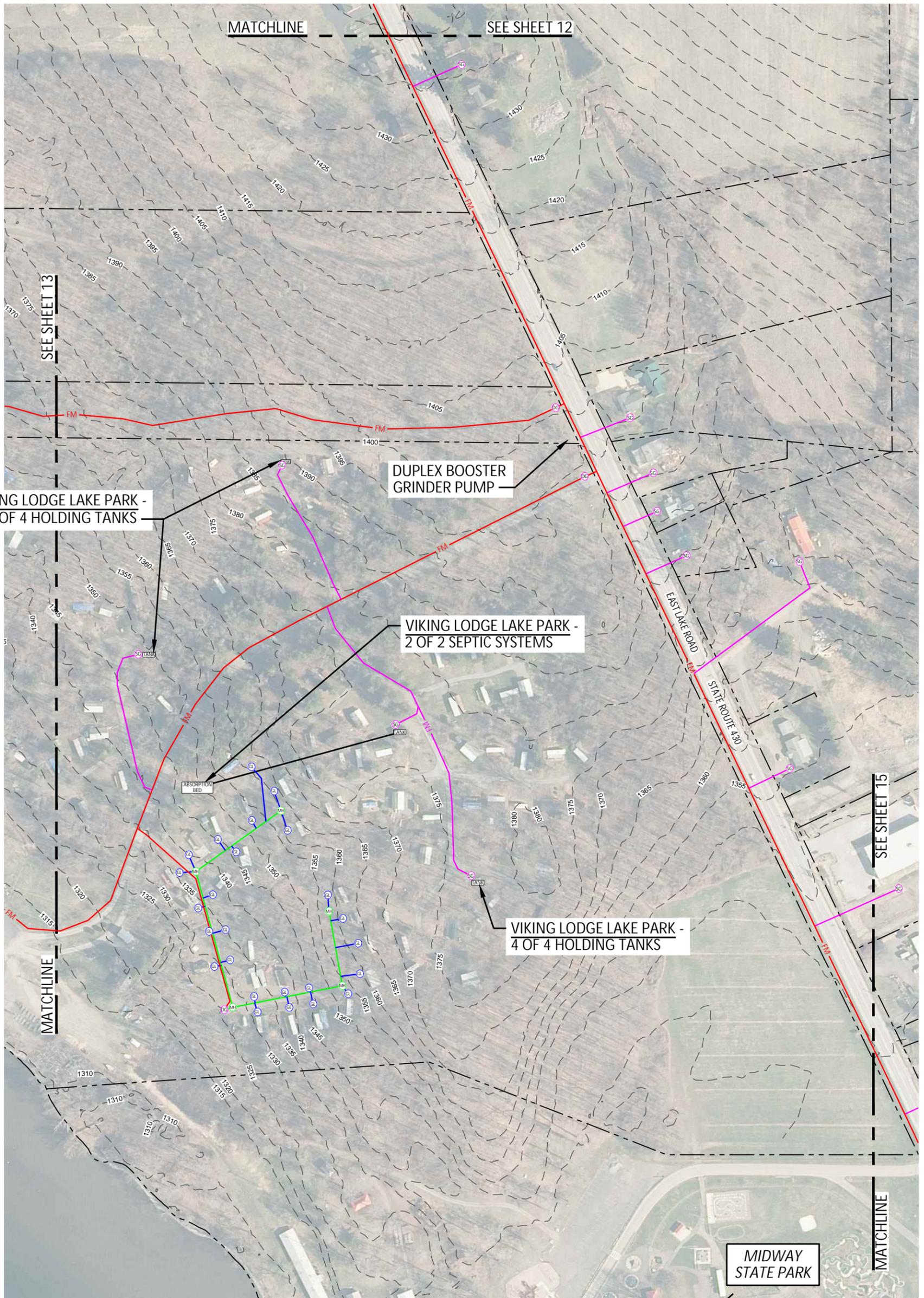
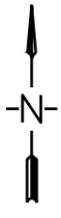
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
**NORTH ELLERY 3 / JIM CLUB
 / VIKING LODGE LAKE PARK**

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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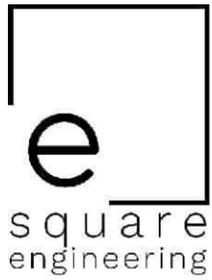
VIKING LODGE LAKE PARK -
2/3 OF 4 HOLDING TANKS

DUPLEX BOOSTER
GRINDER PUMP

VIKING LODGE LAKE PARK -
2 OF 2 SEPTIC SYSTEMS

VIKING LODGE LAKE PARK -
4 OF 4 HOLDING TANKS

MIDWAY
STATE PARK

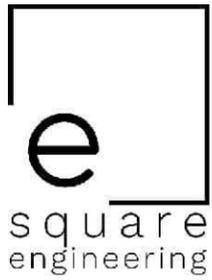
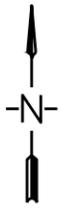


CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE

**NORTH ELLERY 3 /
VIKING LODGE LAKE PARK**

Project No: 125.001	Date: NOVEMBER 2024
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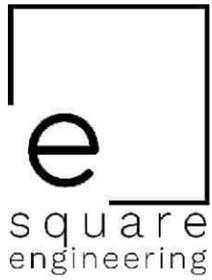
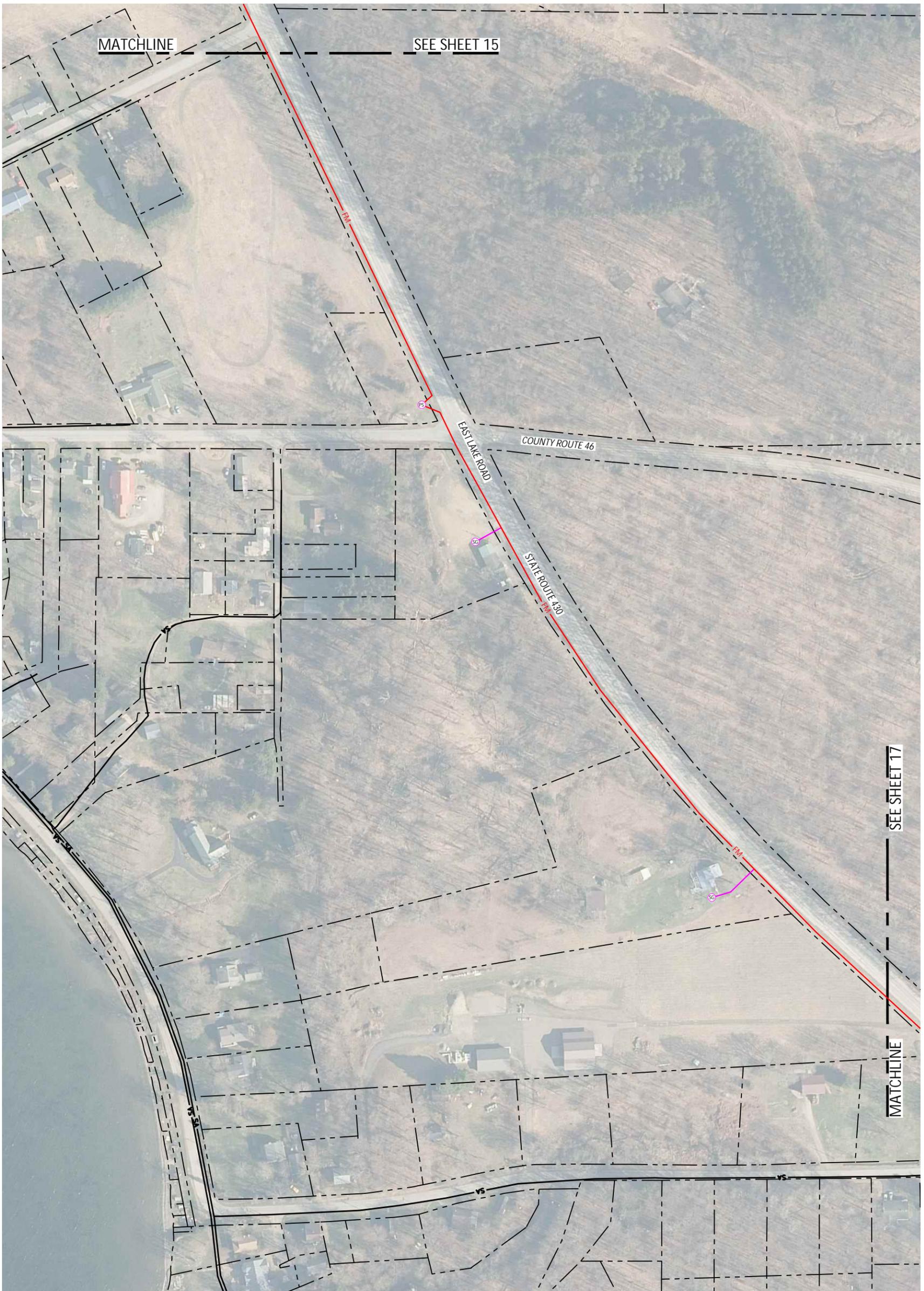
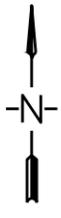
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
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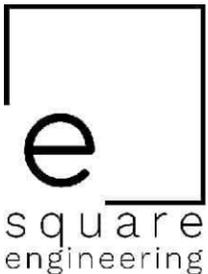
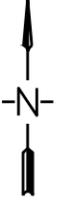
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CHAUTAUQUA COUNTY
 EAST CHAUTAUQUA LAKE SEWER STUDY
 LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
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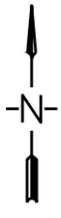
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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
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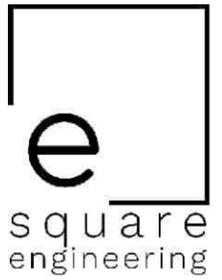


MATCHLINE

SEE SHEET 17

MATCHLINE

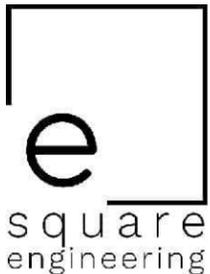
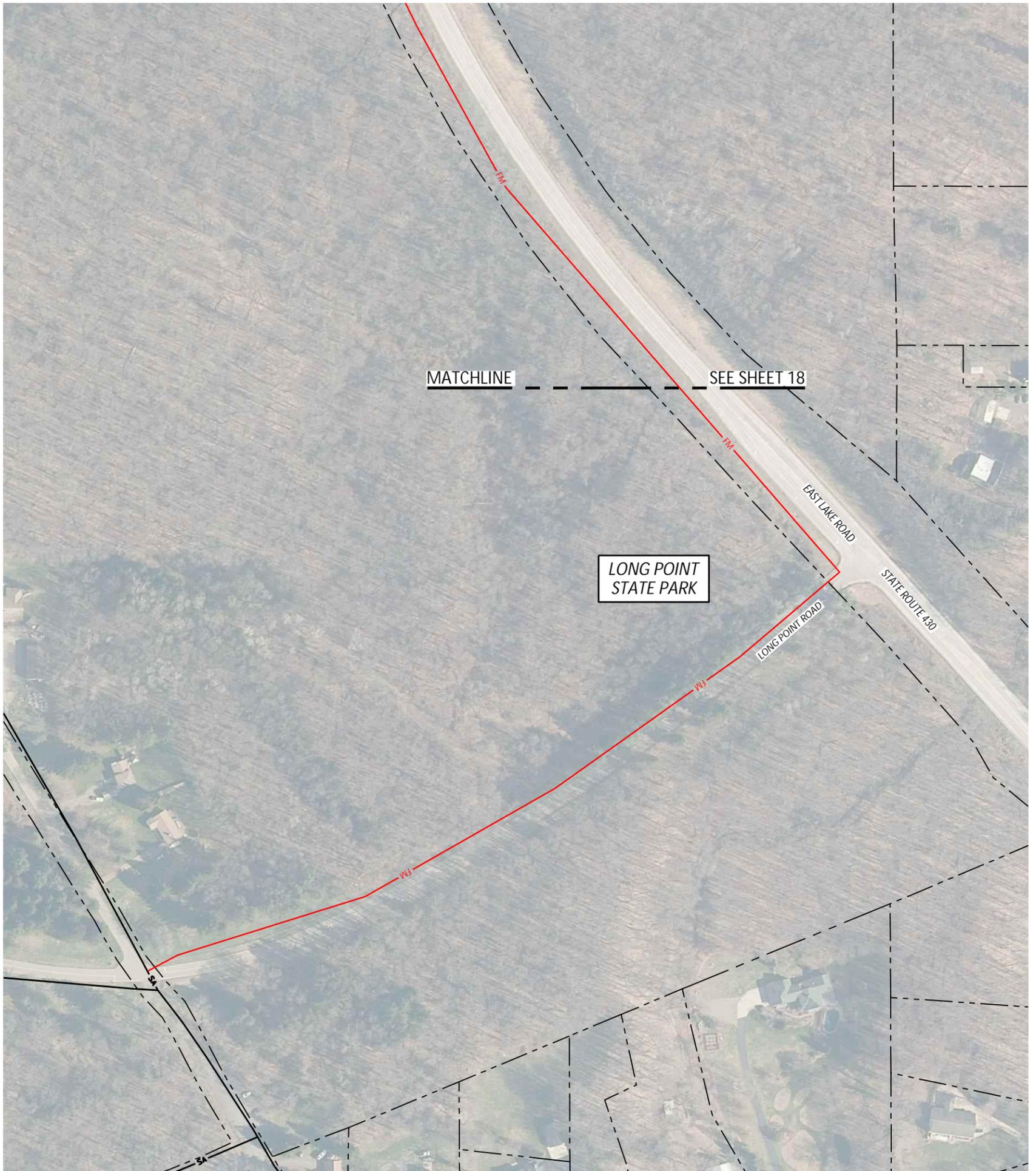
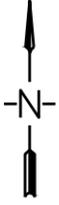
SEE SHEET 19



CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
Checked by: MJZ	Set: PRELIMINARY

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CHAUTAUQUA COUNTY
EAST CHAUTAUQUA LAKE SEWER STUDY
LOW-PRESSURE COLLECTION SYSTEM - NO GOLF COURSE
NORTH ELLERY 3

Project No: 125.001	Date: NOVEMBER 2024
Drawn by: AJM	Scale: AS SHOWN
Checked by: MJZ	Set: PRELIMINARY

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Appendix Q

LOW-Pressure Collection System – Pump Station Calculations

Collection System Alternative No. 2 - Low-Pressure Collection System

**Option No. 1 - All flow to SCCLSD WWTP
inducing the Potential Golf Course Development**

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Service Area Flows

Point Chautauqua	Est. Avg. Day Flow:	23,400	gpd	=	16	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	93,600	gpd	=	65	gpm

Pump Station Design Flow

Nominal Dia.:	6	in.	Minimum Pumping Rate:	152	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	100	gpm
Pipe Standard:	DIPS		<i>Note: Selected pumping rate is lower than min. pump rate (2 ft/s) for a 6 inch for main because this pump station connects directly to the same force main as the Potential Golf Course Development Pump Station which has an estimated pump rate of 150 GPM.</i>		
Pipe Class:	DR11				
Actual ID:	5.571	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1384.00	ft	High Level Alarm =	1376.50	ft
Bottom of Wet Well =	1372.00	ft	Lag Pump On Elevation =	1376.25	ft
Inlet Invert Elevation =	1379.00	ft	Lead Pump On Elevation =	1376.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1374.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 56.55 ft³ = 423 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	26.03	min.	Wet Well Fill Time:	6.51	min.
Wet Well Empty Time:	4.92	min.	Wet Well Empty Time:	6.98	min.
Total Pump Starts / Hour:	1.94		Total Pump Starts / Hour:	4.45	
Starts / Hour / Pump:	0.97		Starts / Hour / Pump:	2.22	
Est. Daily Pump Run Hours	3.81	hrs	Est. Daily Pump Run Hours	12.42	hrs

Storage and Response Times

Storage Volume Above High Alarm: 70.69 ft³ = 528.77 gal.
 ADF Response time for Double Pump/Power Failure: 32.54 min.
 PHF Response time for Double Pump/Power Failure: 8.13 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

6" Force Main

Golf Course Pump Station (Assumed):	150	gpm
Dewittville/ Total No. of Grinder Pumps:	91	
Southern Town of No. of Grinder Pumps Running at Once:	8	
Chautauqua Downstream Flow (11 gpm per pump):	88	gpm

Min. Force Main Flow =	100	gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	160	gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	338	gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

8" Force Main

Golf Course Pump Station (Assumed):	150	gpm
KOA Campground PS Design Point Flow:	75	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Dewittville/ Southern Town of Chautauqua	Total No. of Grinder Pumps:	118
	No. of Grinder Pumps Running at Once:	9
	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	100 gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	189 gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	454 gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

Headloss Calculations - Discharge/High Point

Static Head

Start Elevation:	1,374	ft.
End Elevation:	1,364	ft.
Static Head:	-10.00	ft.

6" Force Main Dynamic Head

Nominal Dia.:	6	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	5.571	in.
Length:	5,150	ft.
C-Value:	130	

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	7.8	1.3
160	18.5	2.1
300	59.3	3.9
338	73.9	4.4
400	101.0	5.3

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	3,050	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.2	0.8
189	4.0	1.4
300	9.4	2.3
454	20.2	3.5
500	24.2	3.8

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow
 Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
-1 feet	13 feet	84 feet

Preliminary Design Point Selection: 100 GPM @ 84 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Service Area Flows

KOA Campground	Est. Avg. Day Flow:	17,745	gpd	=	12	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	70,980	gpd	=	49	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	75	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1405.00	ft	High Level Alarm =	1398.50	ft
Bottom of Wet Well =	1395.00	ft	Lag Pump On Elevation =	1398.25	ft
Inlet Invert Elevation =	1400.00	ft	Lead Pump On Elevation =	1398.00	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1397.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 28.27 ft³ = 212 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	17.16	min.	Wet Well Fill Time:	4.29	min.
Wet Well Empty Time:	3.28	min.	Wet Well Empty Time:	4.67	min.
Total Pump Starts / Hour:	2.93		Total Pump Starts / Hour:	6.69	
Starts / Hour / Pump:	1.47		Starts / Hour / Pump:	3.35	
Est. Daily Pump Run Hours	3.85	hrs	Est. Daily Pump Run Hours	12.51	hrs

Storage and Response Times

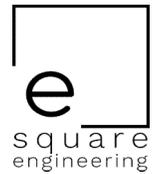
Storage Volume Above High Alarm: 42.41 ft³ = 317.26 gal.
 ADF Response time for Double Pump/Power Failure: 25.75 min.
 PHF Response time for Double Pump/Power Failure: 6.44 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Golf Course Pump Station (Assumed):	150	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	118
	No. of Grinder Pumps Running at Once:	9
	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	75 gpm	<i>KOA Pump Station Only</i>
Avg. Force Main Flow =	168 gpm	<i>KOA + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	454 gpm	<i>KOA + All Potential Downstream Flow</i>

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,364 ft.
 Static Head: -33.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,000 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	1.3	0.5
40	4.9	1.1
60	10.3	1.6
75	15.5	2.0
80	17.5	2.2

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 3,400 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	0.8	0.6
168	3.6	1.3
300	10.5	2.3
400	17.8	3.1
454	22.5	3.5
500	26.9	3.8

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,440 ft.
 Static Head: 43.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 400 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.2	0.5
40	0.6	1.1
60	1.4	1.6
75	2.1	2.0
80	2.3	2.2

Min./Avg./Peak Force Main Flow

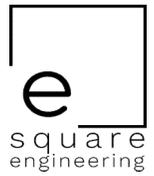
Project: 125.001

Subject: KOA Campground Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Pump Design Data

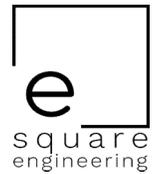
Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
-17 feet	-14 feet	5 feet	45 feet

Preliminary Design Point Selection: 75 GPM @ 45 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Bayberry Landing Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Bayberry Landing Pump Station - Preliminary Calculations

Service Area Flows

Bayberry Landing	Est. Avg. Day Flow:	2,600	gpd	=	2	gpm
	Peaking Factor:	6	<i>*Based on DMR Data</i>			
	Peak Flow Conditions:	15,600	gpd	=	11	gpm

Pump Station Design Flow

Nominal Dia.:	2	in.	Minimum Pumping Rate:	18	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	30	gpm
Pipe Standard:	IPS				
Pipe Class:	DR11				
Actual ID:	1.92	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1332.00	ft	High Level Alarm =	1326.00	ft
Bottom of Wet Well =	1322.00	ft	Lag Pump On Elevation =	1325.75	ft
Inlet Invert Elevation =	1327.00	ft	Lead Pump On Elevation =	1325.50	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1324.00	ft
Inside Diameter of WW =	4.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	78.09	min.	Wet Well Fill Time:	13.02	min.
Wet Well Empty Time:	4.98	min.	Wet Well Empty Time:	6.40	min.
Total Pump Starts / Hour:	0.72		Total Pump Starts / Hour:	3.09	
Starts / Hour / Pump:	0.36		Starts / Hour / Pump:	1.55	
Est. Daily Pump Run Hours	1.44	hrs	Est. Daily Pump Run Hours	7.91	hrs

Storage and Response Times

Storage Volume Above High Alarm:	12.57	ft ³	=	94.00	gal.
ADF Response time for Double Pump/Power Failure:	52.06	min.			
PHF Response time for Double Pump/Power Failure:	8.68	min.			

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Golf Course Pump Station (Assumed):	150	gpm
Point Chautauqua PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Southern Town of Chautauqua	Total No. of Grinder Pumps:	118
	No. of Grinder Pumps Running at Once:	9
	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	30	gpm	<i>Bayberry Pump Station Only</i>
Avg. Force Main Flow =	136	gpm	<i>Bayberry + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	454	gpm	<i>Bayberry + All Potential Downstream Flow</i>



Bayberry Landing Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,324 ft.
 End Elevation: 1,364 ft.
 Static Head: 40.00 ft.

2" Force Main Dynamic Head

Nominal Dia.: 2 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 1.92 in.
 Length: 100 ft.
 C-Value: 130

Flow (gpm)	2" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
10	0.4	1.1
20	1.4	2.2
30	2.9	3.3
40	4.9	4.4
50	7.5	5.5

Min./Avg./Peak Force Main Flow

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 7.305 in.
 Length: 1,950 ft.
 C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.1	0.2
136	1.4	1.0
300	6.0	2.3
400	10.2	3.1
454	12.9	3.5
500	15.5	3.8

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
43 feet	44 feet	56 feet

Preliminary Design Point Selection: 30 GPM @ 56 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001

Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Service Area Flows

Golf Course Pump Station Flow Rate (Assumed):	150	gpm
Point Chuatauqua Pump Station Design Flow Rate:	100	gpm
KOA Pump Station Design Flow Rate:	75	gpm
Bayberry Landing Pump Station Design Flow Rate:	30	gpm
Total No. of Grinder Pumps:	120	
Grinder Pumps No. of Grinder Pumps Running at Once:	9	
Flow Rate Flow (11 gpm per pump):	99	gpm
Crosswinds Marina Est. Avg. Day Flow:	3,700	gpd = 3 gpm
Est. Max. Day Flow:	21,200	gpd = 15 gpm

Peak Service Area Flow =	469	gpm
Average Service Area Flow =	116	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	10	in.	Minimum Pumping Rate:	393	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	500	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	8.961	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1369.00	ft	High Level Alarm =	1361.50	ft
Bottom of Wet Well =	1357.00	ft	Lag Pump On Elevation =	1361.25	ft
Inlet Invert Elevation =	1364.00	ft	Lead Pump On Elevation =	1361.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1359.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	10.12	min.	Wet Well Fill Time:	2.51	min.
Wet Well Empty Time:	2.90	min.	Wet Well Empty Time:	4.55	min.
Total Pump Starts / Hour:	4.61		Total Pump Starts / Hour:	8.50	
Starts / Hour / Pump:	2.30		Starts / Hour / Pump:	4.25	
Est. Daily Pump Run Hours	5.34	hrs	Est. Daily Pump Run Hours	15.48	hrs

Storage and Response Times

Storage Volume Above High Alarm:	196.35	ft ³ = 1468.79	gal.
ADF Response time for Double Pump/Power Failure:	12.65	min.	
PHF Response time for Double Pump/Power Failure:	3.13	min.	

Project: 125.001
 Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Total No. of Grinder Pumps:	61
North Ellery 1, 2, 3 No. of Grinder Pumps Running at Once:	7
Downstream Flow (11 gpm per pump):	77 gpm

Min. Force Main Flow =	500 gpm	<i>Crosswinds Marina Pump Station Only</i>
Avg. Force Main Flow =	519 gpm	<i>Crosswinds Marina + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	577 gpm	<i>Crosswinds Marina + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,363	ft.
Static Head:	4.00	ft.

10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	12,150	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	6.5	1.0
400	23.6	2.0
500	35.6	2.5
519	38.2	2.6
577	46.4	2.9
600	49.9	3.1

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,475	ft.
Static Head:	116.00	ft.

10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	4,350	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	2.3	1.0
400	8.4	2.0
500	12.8	2.5
519	13.7	2.6
577	16.6	2.9
600	17.9	3.1

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

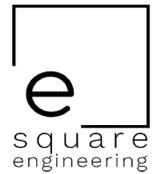
Pump Design Data

To Discharge			To High Point		
Min. Flow	Avg. Flow	Peak Flow	Min. Flow	Avg. Flow	Peak Flow
40 feet	42 feet	50 feet	129 feet	130 feet	133 feet

Preliminary Design Point Selection: 500 GPM @ 133 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: County Route 46 Pump Station Preliminary Calculations - Option 1
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Service Area Flows

Crosswinds Marina Pump Station Design Flow Rate:	500	gpm
Total No. of Grinder Pumps:	61	
Grinder Pumps No. of Grinder Pumps Running at Once:	7	
Flow Rate Flow (11 gpm per pump):	77	gpm

Peak Service Area Flow =	577	gpm
Average Service Area Flow =	144	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	10	in.	Minimum Pumping Rate:	393	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	350	gpm
Pipe Standard:	DIPS		<i>Note: The Selected Pumping Rate is lower than Peak Service Area Flow because it is recommended for a flow equalization tank to be installed at this pump station to reduce stress on downstream infrastructure.</i>		
Pipe Class:	DR11				
Actual ID:	8.961	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1374.00	ft	High Level Alarm =	1366.50	ft
Bottom of Wet Well =	1362.00	ft	Lag Pump On Elevation =	1366.25	ft
Inlet Invert Elevation =	1369.00	ft	Lead Pump On Elevation =	1366.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1364.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	8.15	min.	Wet Well Fill Time:	2.04	min.
Wet Well Empty Time:	4.74	min.	Wet Well Empty Time:	8.89	min.
Total Pump Starts / Hour:	4.66		Total Pump Starts / Hour:	5.49	
Starts / Hour / Pump:	2.33		Starts / Hour / Pump:	2.75	
Est. Daily Pump Run Hours	8.83	hrs	Est. Daily Pump Run Hours	19.53	hrs

Storage and Response Times

Storage Volume Above High Alarm: 196.35 ft³ = 1468.79 gal.
 ADF Response time for Double Pump/Power Failure: 10.18 min.
 PHF Response time for Double Pump/Power Failure: 2.55 min.



County Route 46 Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Ex. 10" Force Main - Part 1

Maple Springs Pump Station Design Point Flow:	275	gpm
Sunset Bay Grinder Pump Station Flow:	30	gpm
Bemus School Grinder Pump Station Flow:	30	gpm

Min. Force Main Flow =	350	gpm	<i>County Route 46 Pump Station Only</i>
Avg. Force Main Flow =	434	gpm	<i>County Route 46 + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	685	gpm	<i>County Route 46 + All Potential Downstream Flow</i>

Ex. 10" Force Main - Part 2

Bemus Point Pump Station Design Point Flow:	360	gpm
---	-----	-----

Min. Force Main Flow =	350	gpm	<i>County Route 46 Pump Station Only</i>
Avg. Force Main Flow =	524	gpm	<i>County Route 46 + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	1045	gpm	<i>County Route 46 + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,310	ft.
Static Head:	-54.50	ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	8.961	in.
Length:	8,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.2	0.5
200	4.5	1.0
300	9.5	1.5
350	12.6	1.8
400	16.1	2.0

Min./Avg./Peak Force Main Flow

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.
Pipe Type:	PVC	
Actual ID:	9.79	in.
Length:	15,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	5.4	0.9
300	11.3	1.3
350	15.1	1.5
434	22.5	1.8
500	29.2	2.1
685	52.2	2.9
800	69.6	3.4

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

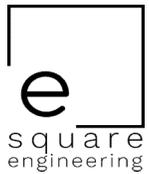
Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point - Continued

Ex. 10" Force Main Dynamic Head - Part 2

Nominal Dia.:	10 in.	Flow (gpm)	10" Pipe		
Pipe Type:	PVC		TDH (ft)	V (ft/s)	
Actual ID:	9.79 in.	0	0.0	0.0	
Length:	3,200 ft.	150	0.7	0.6	
C-Value:	130	300	2.4	1.3	
		350	3.2	1.5	Min. Force Main Flow
		524	6.7	2.2	Avg. Force Main Flow
		650	9.9	2.8	
		800	14.6	3.4	
		1045	23.9	4.5	Peak Force Main Flow

Headloss Calculations - Force Main High Point 1

Static Head

Start Elevation:	1,364 ft.
End Elevation:	1,470 ft.
Static Head:	106 ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10 in.	Flow (gpm)	10" Pipe		
Pipe Type:	HDPE		TDH (ft)	V (ft/s)	
Pipe Standard:	DIPS	0	0.0	0.0	
Pipe Class:	DR11	100	0.7	0.5	
Actual ID:	8.961 in.	200	2.4	1.0	
Length:	4,500 ft.	300	5.1	1.5	
C-Value:	130	350	6.8	1.8	Min./Avg./Peak Force Main Flow
		400	8.7	2.0	

Headloss Calculations - Force Main High Point 2

Static Head

Start Elevation:	1,364 ft.
End Elevation:	1,337 ft.
Static Head:	-27.00 ft.

New 10" Force Main Dynamic Head

Nominal Dia.:	10 in.	Flow (gpm)	10" Pipe		
Pipe Type:	HDPE		TDH (ft)	V (ft/s)	
Pipe Standard:	DIPS	0	0.0	0.0	
Pipe Class:	DR11	100	1.2	0.5	
Actual ID:	8.961 in.	200	4.5	1.0	
Length:	8,300 ft.	300	9.5	1.5	
C-Value:	130	350	12.6	1.8	Min./Avg./Peak Force Main Flow
		400	16.1	2.0	

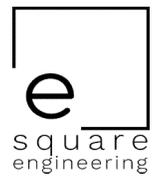
Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 1

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Ex. 10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.	Flow (gpm)	10" Pipe		
Pipe Type:	PVC		TDH (ft)	V (ft/s)		
Actual ID:	9.79	in.	0	0.0	0.0	
Length:	7,300	ft.	200	2.6	0.0	
C-Value:	130		300	5.4	0.0	
			350	7.2	0.0	Min. Force Main Flow
			434	10.7	0.0	Avg. Force Main Flow
			500	13.9	0.0	
			685	24.9	0.0	Peak Force Main Flow
			800	33.2	0.0	

Pump Design Data

<u>To Discharge</u>			<u>To High Point 1</u>	<u>To High Point 2</u>		
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak	Min. Flow	Avg. Flow	Peak Flow
-24 feet	-13 feet	34 feet	113 feet	-7 feet	-4 feet	11 feet

Preliminary Design Point Selection: 350 GPM @ 113 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Collection System Alternative No. 2 - Low-Pressure Collection System

**Option No. 2 - All flow to SCCLSD WWTP
except the Potential Golf Course Development**

Project: 125.001
 Subject: Point Chautauqua Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Point Chautauqua Pump Station - Preliminary Calculations

Service Area Flows

Point Chautauqua	Est. Avg. Day Flow:	23,400	gpd	=	16	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	93,600	gpd	=	65	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	100	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1384.00	ft	High Level Alarm =	1376.50	ft
Bottom of Wet Well =	1372.00	ft	Lag Pump On Elevation =	1376.25	ft
Inlet Invert Elevation =	1379.00	ft	Lead Pump On Elevation =	1376.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1374.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 56.55 ft³ = 423 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	26.03	min.	Wet Well Fill Time:	6.51	min.
Wet Well Empty Time:	4.92	min.	Wet Well Empty Time:	6.98	min.
Total Pump Starts / Hour:	1.94		Total Pump Starts / Hour:	4.45	
Starts / Hour / Pump:	0.97		Starts / Hour / Pump:	2.22	
Est. Daily Pump Run Hours	3.81	hrs	Est. Daily Pump Run Hours	12.42	hrs

Storage and Response Times

Storage Volume Above High Alarm: 70.69 ft³ = 528.77 gal.
 ADF Response time for Double Pump/Power Failure: 32.54 min.
 PHF Response time for Double Pump/Power Failure: 8.13 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

4" Force Main

Dewittville/	Total No. of Grinder Pumps:	45
Southern Town of	No. of Grinder Pumps Running at Once:	6
Chautauqua	Downstream Flow (11 gpm per pump):	66 gpm

Min. Force Main Flow =	100 gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	117 gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	166 gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>



Point Chautauqua Pump Station - Preliminary Calculations

6" Force Main

KOA Campground PS Design Point Flow:	75	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Dewittville/ Southern Town of Chautauqua	Total No. of Grinder Pumps:	118
	No. of Grinder Pumps Running at Once:	9
	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	100 gpm	<i>Point Chautauqua Pump Station Only</i>
Avg. Force Main Flow =	151 gpm	<i>Point Chautauqua + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	304 gpm	<i>Point Chautauqua + All Potential Downstream Flow</i>

Headloss Calculations - Discharge/High Point

Static Head

Start Elevation:	1,374	ft.
End Elevation:	1,364	ft.
Static Head:	-10.00	ft.

4" Force Main Dynamic Head

Nominal Dia.:	4	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	3.876	in.
Length:	6,150	ft.
C-Value:	130	

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
50	15.0	1.4
100	54.2	2.7
117	72.5	3.2
166	138.4	4.5
200	195.4	5.4

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

6" Force Main Dynamic Head

Nominal Dia.:	6	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	5.571	in.
Length:	2,050	ft.
C-Value:	130	

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	3.1	1.3
151	6.6	2.0
200	11.1	2.6
304	24.2	4.0
400	40.2	5.3

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
47 feet	69 feet	153 feet

Preliminary Design Point Selection: 100 GPM @ 153 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Service Area Flows

KOA Campground	Est. Avg. Day Flow:	17,745	gpd	=	12	gpm
	Peaking Factor:	4				
	Peak Flow Conditions:	70,980	gpd	=	49	gpm

Pump Station Design Flow

Nominal Dia.:	4	in.	Minimum Pumping Rate:	74	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	75	gpm
Pipe Standard:	DIPS				
Pipe Class:	DR11				
Actual ID:	3.876	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1405.00	ft	High Level Alarm =	1398.50	ft
Bottom of Wet Well =	1395.00	ft	Lag Pump On Elevation =	1398.25	ft
Inlet Invert Elevation =	1400.00	ft	Lead Pump On Elevation =	1398.00	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1397.00	ft
Inside Diameter of WW =	6.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 28.27 ft³ = 212 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	17.16	min.	Wet Well Fill Time:	4.29	min.
Wet Well Empty Time:	3.28	min.	Wet Well Empty Time:	4.67	min.
Total Pump Starts / Hour:	2.93		Total Pump Starts / Hour:	6.69	
Starts / Hour / Pump:	1.47		Starts / Hour / Pump:	3.35	
Est. Daily Pump Run Hours	3.85	hrs	Est. Daily Pump Run Hours	12.51	hrs

Storage and Response Times

Storage Volume Above High Alarm: 42.41 ft³ = 317.26 gal.
 ADF Response time for Double Pump/Power Failure: 25.75 min.
 PHF Response time for Double Pump/Power Failure: 6.44 min.

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Point Chautauqua PS Design Point Flow:	100	gpm
Bayberry Landing PS Design Point Flow:	30	gpm
Dewittville/	Total No. of Grinder Pumps:	118
Southern Town of	No. of Grinder Pumps Running at Once:	9
Chautauqua	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	75 gpm	<i>KOA Pump Station Only</i>
Avg. Force Main Flow =	132 gpm	<i>KOA + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	304 gpm	<i>KOA + All Potential Downstream Flow</i>

Project: 125.001
 Subject: KOA Campground Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,364 ft.
 Static Head: -33.00 ft.

4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 3,000 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	1.3	0.5
40	4.9	1.1
60	10.3	1.6
75	15.5	2.0
80	17.5	2.2

Min./Avg./Peak Force Main Flow

6" Force Main Dynamic Head

Nominal Dia.: 6 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 5.571 in.
 Length: 3,400 ft.
 C-Value: 130

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	3.0	1.0
132	8.6	1.7
200	18.5	2.6
304	40.1	4.0
400	66.7	5.3

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation: 1,397 ft.
 End Elevation: 1,440 ft.
 Static Head: 43.00 ft.

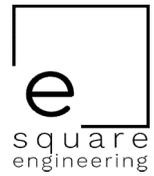
4" Force Main Dynamic Head

Nominal Dia.: 4 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 3.876 in.
 Length: 400 ft.
 C-Value: 130

Flow (gpm)	4" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
20	0.2	0.5
40	0.6	1.1
60	1.4	1.6
75	2.1	2.0
80	2.3	2.2

Min./Avg./Peak Force Main Flow

Project: 125.001
Subject: KOA Campground Pump Station Preliminary Calculations - Option 2
Calculated by: AJM
Checked by: MJZ
Date: 11/14/2024



KOA Campground Pump Station - Preliminary Calculations

Pump Design Data

Design Head

<u>To Discharge</u>			<u>To High Point</u>
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak
-14 feet	-9 feet	23 feet	45 feet

Preliminary Design Point Selection: 75 GPM @ 45 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: Bayberry Landing Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/14/2024



Bayberry Landing Pump Station - Preliminary Calculations

Service Area Flows

Bayberry Landing	Est. Avg. Day Flow:	2,600	gpd	=	2	gpm
	Peaking Factor:	6	<i>*Based on DMR Data</i>			
	Peak Flow Conditions:	15,600	gpd	=	11	gpm

Pump Station Design Flow

Nominal Dia.:	2	in.	Minimum Pumping Rate:	18	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	30	gpm
Pipe Standard:	IPS				
Pipe Class:	DR11				
Actual ID:	1.92	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1332.00	ft	High Level Alarm =	1326.00	ft
Bottom of Wet Well =	1322.00	ft	Lag Pump On Elevation =	1325.75	ft
Inlet Invert Elevation =	1327.00	ft	Lead Pump On Elevation =	1325.50	ft
Wet Well Depth =	10.00	ft	Pump Off Elevation =	1324.00	ft
Inside Diameter of WW =	4.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 18.85 ft³ = 141 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	78.09	min.	Wet Well Fill Time:	13.02	min.
Wet Well Empty Time:	4.98	min.	Wet Well Empty Time:	6.40	min.
Total Pump Starts / Hour:	0.72		Total Pump Starts / Hour:	3.09	
Starts / Hour / Pump:	0.36		Starts / Hour / Pump:	1.55	
Est. Daily Pump Run Hours	1.44	hrs	Est. Daily Pump Run Hours	7.91	hrs

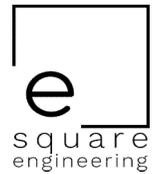
Storage and Response Times

Storage Volume Above High Alarm:	12.57	ft ³	=	94.00	gal.
ADF Response time for Double Pump/Power Failure:	52.06	min.			
PHF Response time for Double Pump/Power Failure:	8.68	min.			

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Point Chautauqua PS Design Point Flow:	100	gpm
KOA Campground PS Design Point Flow:	75	gpm
Dewittville/	Total No. of Grinder Pumps:	118
Southern Town of	No. of Grinder Pumps Running at Once:	9
Chautauqua	Downstream Flow (11 gpm per pump):	99 gpm

Min. Force Main Flow =	30 gpm	<i>Bayberry Pump Station Only</i>
Avg. Force Main Flow =	99 gpm	<i>Bayberry + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	304 gpm	<i>Bayberry + All Potential Downstream Flow</i>



Bayberry Landing Pump Station - Preliminary Calculations

Headloss Calculations - Discharge/High Point

Static Head

Start Elevation: 1,324 ft.
 End Elevation: 1,364 ft.
 Static Head: 40.00 ft.

2" Force Main Dynamic Head

Nominal Dia.: 2 in.
 Pipe Type: HDPE
 Pipe Standard: IPS
 Pipe Class: DR11
 Actual ID: 1.92 in.
 Length: 100 ft.
 C-Value: 130

Flow (gpm)	2" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
10	0.4	1.1
20	1.4	2.2
30	2.9	3.3
40	4.9	4.4
50	7.5	5.5

Min./Avg./Peak Force Main Flow

6" Force Main Dynamic Head

Nominal Dia.: 6 in.
 Pipe Type: HDPE
 Pipe Standard: DIPS
 Pipe Class: DR11
 Actual ID: 5.571 in.
 Length: 1,950 ft.
 C-Value: 130

Flow (gpm)	6" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
30	0.3	0.4
99	2.9	1.3
200	10.6	2.6
300	22.5	3.9
304	23.0	4.0
400	38.2	5.3

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Pump Design Data

Design Head

To Discharge/High Point		
Min. Flow	Avg. Flow	Peak Flow
43 feet	46 feet	66 feet

Preliminary Design Point Selection: 30 GPM @ 66 feet TDH

Note: Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

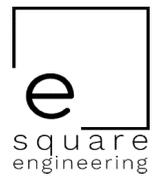
Project: 125.001

Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Service Area Flows

Point Chuatauqua Pump Station Design Flow Rate:		100	gpm
KOA Pump Station Design Flow Rate:		75	gpm
Bayberry Landing Pump Station Design Flow Rate:		30	gpm
Total No. of Grinder Pumps:		120	
Grinder Pumps	No. of Grinder Pumps Running at Once:	9	
	Flow Rate Flow (11 gpm per pump):	99	gpm
Crosswinds Marina	Est. Avg. Day Flow:	3,700	gpd = 3 gpm
	Est. Max. Day Flow:	21,200	gpd = 15 gpm

Peak Service Area Flow =	319	gpm
Average Service Area Flow =	79	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	8 in.	Minimum Pumping Rate:	261 gpm
Pipe Type:	HDPE	Selected Pumping Rate:	350 gpm
Pipe Standard:	DIPS		
Pipe Class:	DR11		
Actual ID:	7.305 in.		

Wet Well Sizing

Wet Well Rim Elevation =	1369.00 ft	High Level Alarm =	1361.50 ft
Bottom of Wet Well =	1357.00 ft	Lag Pump On Elevation =	1361.25 ft
Inlet Invert Elevation =	1364.00 ft	Lead Pump On Elevation =	1361.00 ft
Wet Well Depth =	12.00 ft	Pump Off Elevation =	1359.00 ft
Inside Diameter of WW =	10.00 ft		

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	14.96	min.	Wet Well Fill Time:	3.69	min.
Wet Well Empty Time:	4.11	min.	Wet Well Empty Time:	6.41	min.
Total Pump Starts / Hour:	3.15		Total Pump Starts / Hour:	5.94	
Starts / Hour / Pump:	1.57		Starts / Hour / Pump:	2.97	
Est. Daily Pump Run Hours	5.17	hrs	Est. Daily Pump Run Hours	15.24	hrs

Storage and Response Times

Storage Volume Above High Alarm:	196.35 ft ³ = 1468.79 gal.
ADF Response time for Double Pump/Power Failure:	18.69 min.
PHF Response time for Double Pump/Power Failure:	4.61 min.

Project: 125.001

Subject: Crosswinds Marina Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/14/2024



Crosswinds Marina Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Total No. of Grinder Pumps:	61
North Ellery 1, 2, 3 No. of Grinder Pumps Running at Once:	7
Downstream Flow (11 gpm per pump):	77 gpm

Min. Force Main Flow =	350 gpm	<i>Crosswinds Marina Pump Station Only</i>
Avg. Force Main Flow =	369 gpm	<i>Crosswinds Marina + 25% of Potential Downstream Flow</i>
Peak Force Main Flow =	427 gpm	<i>Crosswinds Marina + All Potential Downstream Flow</i>

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,363	ft.
Static Head:	4.00	ft.

8" Force Main Dynamic Head

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	12,150	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	17.7	1.5
350	49.8	2.7
369	54.9	2.8
400	63.7	3.1
427	71.9	3.3
500	96.3	3.8

Min. Force Main Flow
Avg. Force Main Flow
Peak Force Main Flow

Headloss Calculations - Force Main High Point

Static Head

Start Elevation:	1,359	ft.
End Elevation:	1,475	ft.
Static Head:	116.00	ft.

8" Force Main Dynamic Head

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	4,350	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
200	6.3	1.5
350	17.8	2.7
369	19.7	2.8
400	22.8	3.1
427	25.7	3.3
500	34.5	3.8

Min. Force Main Flow
Avg. Force Main Flow
Peak Force Main Flow

Pump Design Data

To Discharge			To High Point		
Min. Flow	Avg. Flow	Peak Flow	Min. Flow	Avg. Flow	Peak Flow
54 feet	59 feet	4 feet	134 feet	136 feet	142 feet

Preliminary Design Point Selection: 350 GPM @ 142 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Project: 125.001
 Subject: County Route 46 Pump Station Preliminary Calculations - Option 2
 Calculated by: AJM
 Checked by: MJZ
 Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Service Area Flows

Crosswinds Marina Pump Station Design Flow Rate:	350	gpm
Total No. of Grinder Pumps:	61	
Grinder Pumps No. of Grinder Pumps Running at Once:	7	
Flow Rate Flow (11 gpm per pump):	77	gpm

Peak Service Area Flow =	427	gpm
Average Service Area Flow =	107	gpm

Assumes 25% of peak flow (i.e. Peaking Factor of 4)

Pump Station Design Flow

Nominal Dia.:	8	in.	Minimum Pumping Rate:	261	gpm
Pipe Type:	HDPE		Selected Pumping Rate:	300	gpm
Pipe Standard:	DIPS		<i>Note : The Selected Pumping Rate is lower than Peak Service Area Flow because it is recommended for a flow equalization tank to be installed at this pump station to reduce stress on downstream infrastructure.</i>		
Pipe Class:	DR11				
Actual ID:	7.305	in.			

Wet Well Sizing

Wet Well Rim Elevation =	1374.00	ft	High Level Alarm =	1366.50	ft
Bottom of Wet Well =	1362.00	ft	Lag Pump On Elevation =	1366.25	ft
Inlet Invert Elevation =	1369.00	ft	Lead Pump On Elevation =	1366.00	ft
Wet Well Depth =	12.00	ft	Pump Off Elevation =	1364.00	ft
Inside Diameter of WW =	10.00	ft			

Pump Cycles and Fill Times

Cycle Volume (Pump on - Pump Off): 157.08 ft³ = 1175 gal.

Average Daily Flow			Peak Hour Flow		
Wet Well Fill Time:	11.01	min.	Wet Well Fill Time:	2.75	min.
Wet Well Empty Time:	5.31	min.	Wet Well Empty Time:	9.49	min.
Total Pump Starts / Hour:	3.68		Total Pump Starts / Hour:	4.90	
Starts / Hour / Pump:	1.84		Starts / Hour / Pump:	2.45	
Est. Daily Pump Run Hours	7.81	hrs	Est. Daily Pump Run Hours	18.61	hrs

Storage and Response Times

Storage Volume Above High Alarm: 196.35 ft³ = 1468.79 gal.
 ADF Response time for Double Pump/Power Failure: 13.76 min.
 PHF Response time for Double Pump/Power Failure: 3.44 min.



County Route 46 Pump Station - Preliminary Calculations

Downstream Flows (Connected to Force Main but not pumped by this Pump Station):

Ex. 10" Force Main - Part 1

Maple Springs Pump Station Design Point Flow:	275	gpm
Sunset Bay Grinder Pump Station Flow:	20	gpm
Bemus School Grinder Pump Station Flow:	20	gpm

Min. Force Main Flow =	300	gpm	County Route 46 Pump Station Only
Avg. Force Main Flow =	379	gpm	County Route 46 + 25% of Potential Downstream Flow
Peak Force Main Flow =	615	gpm	County Route 46 + All Potential Downstream Flow

Ex. 10" Force Main - Part 2

Bemus Point Pump Station Design Point Flow:	360	gpm
---	-----	-----

Min. Force Main Flow =	300	gpm	County Route 46 Pump Station Only
Avg. Force Main Flow =	469	gpm	County Route 46 + 25% of Potential Downstream Flow
Peak Force Main Flow =	975	gpm	County Route 46 + All Potential Downstream Flow

Headloss Calculations - Discharge Point

Static Head

Start Elevation:	1,364	ft.
End Elevation:	1,310	ft.
Static Head:	-54.50	ft.

8" Force Main Dynamic Head

Nominal Dia.:	8	in.
Pipe Type:	HDPE	
Pipe Standard:	DIPS	
Pipe Class:	DR11	
Actual ID:	7.305	in.
Length:	8,300	ft.
C-Value:	130	

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	2.0	0.6
150	7.1	1.1
225	15.0	1.7
300	25.6	2.3
375	38.6	2.9

Min./Avg./Peak Force Main Flow

10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10	in.
Pipe Type:	PVC	
Actual ID:	9.79	in.
Length:	15,300	ft.
C-Value:	130	

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	1.5	0.4
200	5.4	0.9
300	11.3	1.3
379	17.5	1.6
500	29.2	2.1
615	42.8	2.6
700	54.4	3.0

Min. Force Main Flow
 Avg. Force Main Flow
 Peak Force Main Flow

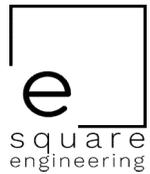
Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Discharge Point - Continued

10" Force Main Dynamic Head - Part 2

Nominal Dia.: 10 in.
Pipe Type: PVC
Actual ID: 9.79 in.
Length: 3,200 ft.
C-Value: 130

Flow (gpm)	10" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
100	0.3	0.4
200	1.1	0.9
300	2.4	1.3
469	5.4	2.0
700	11.4	3.0
975	21.0	4.2

Min. Force Main Flow

Avg. Force Main Flow

Peak Force Main Flow

Headloss Calculations - Force Main High Point 1

Static Head

Start Elevation: 1,364 ft.
End Elevation: 1,470 ft.
Static Head: 106 ft.

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
Pipe Type: HDPE
Pipe Standard: DIPS
Pipe Class: DR11
Actual ID: 7.305 in.
Length: 4,500 ft.
C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	1.1	0.6
150	3.8	1.1
225	8.1	1.7
300	13.9	2.3
375	20.9	2.9

Min./Avg./Peak Force Main Flow

Headloss Calculations - Force Main High Point 2

Static Head

Start Elevation: 1,364 ft.
End Elevation: 1,337 ft.
Static Head: -27.00 ft.

8" Force Main Dynamic Head

Nominal Dia.: 8 in.
Pipe Type: HDPE
Pipe Standard: DIPS
Pipe Class: DR11
Actual ID: 7.305 in.
Length: 8,300 ft.
C-Value: 130

Flow (gpm)	8" Pipe	
	TDH (ft)	V (ft/s)
0	0.0	0.0
75	2.0	0.6
150	7.1	1.1
225	15.0	1.7
300	25.6	2.3
375	38.6	2.9

Min./Avg./Peak Force Main Flow

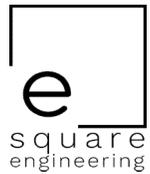
Project: 125.001

Subject: County Route 46 Pump Station Preliminary Calculations - Option 2

Calculated by: AJM

Checked by: MJZ

Date: 11/15/2024



County Route 46 Pump Station - Preliminary Calculations

Headloss Calculations - Force Main High Point 2 - Continued

10" Force Main Dynamic Head - Part 1

Nominal Dia.:	10 in.	Flow (gpm)	10" Pipe		
Pipe Type:	PVC		TDH (ft)	V (ft/s)	
Actual ID:	9.79 in.	0	0.0	0.0	
Length:	7,300 ft.	100	0.7	0.0	
C-Value:	130	200	2.6	0.0	
		300	5.4	0.0	Min. Force Main Flow
		379	8.3	0.0	Avg. Force Main Flow
		500	13.9	0.0	
		615	20.4	0.0	Peak Force Main Flow
		700	25.9	0.0	

Pump Design Data

<u>To Discharge</u>			<u>To High Point 1</u>	<u>To High Point 2</u>		
Min. Flow	Avg. Flow	Peak Flow	Min./Avg./Peak	Min. Flow	Avg. Flow	Peak Flow
-15 feet	-6 feet	35 feet	120 feet	4 feet	7 feet	19 feet

Preliminary Design Point Selection: 300 GPM @ 120 feet TDH

Note : Calculations and selected design point shown above should be considered preliminary. Should this project proceed to the design phase, final design flows and pump calculations should be completed by the design engineer.

Appendix R

Estimate of Probable Project Cost

SCCLSD WWTP and Collection System Improvements

Item	Description	QTY	Unit	Unit Cost	Total
	Flow Equalization Tank	1	LS	\$1,500,000	\$1,500,000
	Collection System Improvements Allowance	1	AL	\$1,000,000	\$1,000,000
	WWTP Improvements Allowance	1	AL	\$300,000	\$300,000
Subtotal of Items					\$2,800,000
Inflation to Construction				6%	\$168,000
Contractor General Conditions				5%	\$140,000
Construction Subtotal					\$3,108,000
Contingency				25%	\$777,000
Engineering/Legal/Administrative				18%	\$560,000
ESTIMATED TOTAL PROJECT COST					\$4,445,000

**Collection System Alternative No. 1 - "Hybrid" Collection System
 Option 1 - All Flow to SCCLSD WWTP with Potential Golf Course Development**

Item	Description	QTY	Unit	Unit Cost	Total
1	8-inch SDR 35 PVC Sewer	22,000	LF	\$100	\$2,200,000
2	Gravity Sewer Trenching	22,000	LF	\$50	\$1,100,000
3	Standard 4-Foot Manhole	92	EA	\$6,000	\$552,000
4	Gravity Wye Connection	193	EA	\$750	\$144,750
5	6-Inch SDR 35 PVC Sewer Lateral	9,600	LF	\$50	\$480,000
6	Jack and Bore Crossing	70	LF	\$600	\$42,000
7	10-Inch DR 11 HDPE Pressure Sewers	20,400	LF	\$80	\$1,632,000
8	8-Inch DR 11 HDPE Pressure Sewers	8,500	LF	\$70	\$595,000
9	4-Inch DR 11 HDPE Pressure Sewers	10,500	LF	\$45	\$472,500
10	3-Inch DR 11 HDPE Pressure Sewers	4,400	LF	\$40	\$176,000
11	2-Inch DR 11 HDPE Pressure Sewers	6,350	LF	\$35	\$222,250
12	1.25-Inch DR 11 HDPE Pressure Sewers	24,800	LF	\$30	\$744,000
13	Simplex Grinder Pump Stations	110	EA	\$15,000	\$1,650,000
14	Simplex Grinder Pump Lateral Kits	110	EA	\$2,000	\$220,000
15	Duplex Grinder Pump Stations	7	EA	\$24,000	\$168,000
16	Duplex Grinder Pump Lateral Kits	7	EA	\$2,000	\$14,000
17	Grinder Pump Electrical Connection	117	EA	\$15,000	\$1,755,000
18	10-Inch Valve and Valve Box	20	EA	\$5,500	\$110,000
19	8-Inch Valve and Valve Box	8	EA	\$4,500	\$36,000
20	4-Inch Valve and Valve Box	10	EA	\$3,000	\$30,000
21	3-Inch Valve and Valve Box	6	EA	\$2,700	\$16,200
22	2-Inch Valve and Valve Box	4	EA	\$2,000	\$8,000
23	Force Main Cleanout	29	EA	\$8,000	\$232,000
24	Air/Vacuum Release Manhole	15	EA	\$15,000	\$225,000
25	Small Main Pump Station	6	EA	\$65,000	\$390,000
26	Medium Main Pump Station	3	EA	\$400,000	\$1,200,000
27	Large Main Pump Station	2	EA	\$500,000	\$1,000,000
28	Dewittville Creek Crossing	1	LS	\$35,000	\$35,000
29	Road Reconstruction	20,000	LF	\$200	\$4,000,000
30	Land Acquisition	1	LS	\$200,000	\$200,000
Subtotal of Items					\$19,650,000
Inflation to Construction				6%	\$1,179,000
Contractor General Conditions				5%	\$983,000
Construction Subtotal					\$21,812,000
Contingency				25%	\$5,453,000
Engineering/Legal/Administrative				18%	\$3,927,000
ESTIMATED TOTAL PROJECT COST					\$31,192,000

**Collection System Alternative No. 1 - "Hybrid" Collection System
 Option 2 - All Flow to SCCLSD WWTP without Potential Golf Course Development**

Item	Description	QTY	Unit	Unit Cost	Total
1	8-inch SDR 35 PVC Sewer	22,000	LF	\$100	\$2,200,000
2	Gravity Sewer Trenching	22,000	LF	\$50	\$1,100,000
3	Standard 4-Foot Manhole	92	EA	\$6,000	\$552,000
4	Gravity Wye Connection	193	EA	\$750	\$144,750
5	6-Inch SDR 35 PVC Sewer Lateral	9,600	LF	\$50	\$480,000
6	Jack and Bore Crossing	70	LF	\$600	\$42,000
7	10-Inch DR 11 HDPE Pressure Sewers	8,300	LF	\$80	\$664,000
8	8-Inch DR 11 HDPE Pressure Sewers	15,500	LF	\$70	\$1,085,000
9	6-Inch DR 11 HDPE Pressure Sewers	2,100	LF	\$60	\$126,000
10	4-Inch DR 11 HDPE Pressure Sewers	10,400	LF	\$45	\$468,000
11	3-Inch DR 11 HDPE Pressure Sewers	4,500	LF	\$40	\$180,000
12	2-Inch DR 11 HDPE Pressure Sewers	6,350	LF	\$35	\$222,250
13	1.25-Inch DR 11 HDPE Pressure Sewers	25,000	LF	\$30	\$750,000
14	Simplex Grinder Pump Stations	106	EA	\$15,000	\$1,590,000
15	Simplex Grinder Pump Lateral Kits	106	EA	\$2,000	\$212,000
16	Duplex Grinder Pump Stations	7	EA	\$24,000	\$168,000
17	Duplex Grinder Pump Lateral Kits	7	EA	\$2,000	\$14,000
18	Grinder Pump Electrical Services	113	EA	\$15,000	\$1,695,000
19	8-Inch Valve and Valve Box	24	EA	\$4,500	\$108,000
20	6-Inch Valve and Valve Box	3	EA	\$3,200	\$9,600
21	4-Inch Valve and Valve Box	10	EA	\$3,000	\$30,000
22	3-Inch Valve and Valve Box	6	EA	\$2,700	\$16,200
23	2-Inch Valve and Valve Box	4	EA	\$2,000	\$8,000
24	Force Main Cleanout	23	EA	\$8,000	\$184,000
25	Air/Vacuum Release Manhole	15	EA	\$15,000	\$225,000
26	Small Main Pump Station	6	EA	\$65,000	\$390,000
27	Medium Main Pump Station	3	EA	\$400,000	\$1,200,000
28	Large Main Pump Station	2	EA	\$500,000	\$1,000,000
29	Dewittville Creek Crossing	1	LS	\$35,000	\$35,000
30	Road Reconstruction	20,000	LF	\$200	\$4,000,000
31	Land Acquisition	1	LS	\$200,000	\$200,000
Subtotal of Items					\$19,099,000
Inflation to Construction				6%	\$1,146,000
Contractor General Conditions				5%	\$955,000
Construction Subtotal					\$21,200,000
Contingency				25%	\$5,300,000
Engineering/Legal/Administrative				18%	\$3,816,000
ESTIMATED TOTAL PROJECT COST					\$30,316,000

Collection System Alternative No. 2 - Low-Pressure Collection System
Option 1 - All Flow to SCCLSD WWTP with Potential Golf Course Development

Item	Description	QTY	Unit	Unit Cost	Total
1	8-inch SDR 35 PVC Sewer	900	LF	\$100	\$90,000
2	Gravity Sewer Trenching	900	LF	\$50	\$45,000
3	Standard 4-Foot Manhole	5	EA	\$6,000	\$30,000
4	Gravity Wye Connection	25	EA	\$750	\$18,750
5	6-Inch SDR 35 PVC Sewer Lateral	700	LF	\$50	\$35,000
6	10-Inch DR 11 HDPE Pressure Sewers	20,400	LF	\$80	\$1,632,000
7	8-Inch DR 11 HDPE Pressure Sewers	3,400	LF	\$70	\$238,000
8	6-Inch DR 11 HDPE Pressure Sewers	5,200	LF	\$60	\$312,000
9	4-Inch DR 11 HDPE Pressure Sewers	7,500	LF	\$45	\$337,500
10	3-Inch DR 11 HDPE Pressure Sewers	8,400	LF	\$40	\$336,000
11	2-Inch DR 11 HDPE Pressure Sewers	19,250	LF	\$35	\$673,750
12	1.25-Inch DR 11 HDPE Pressure Sewers	36,000	LF	\$30	\$1,080,000
13	Simplex Grinder Pump Stations	278	EA	\$15,000	\$4,170,000
14	Simplex Grinder Pump Lateral Kits	278	EA	\$2,000	\$556,000
15	Duplex Grinder Pump Stations	5	EA	\$24,000	\$120,000
16	Duplex Grinder Pump Lateral Kits	5	EA	\$2,000	\$10,000
17	Grinder Pump Electrical Services	283	EA	\$15,000	\$4,245,000
18	10-Inch Valve and Valve Box	20	EA	\$5,500	\$110,000
19	8-Inch Valve and Valve Box	3	EA	\$4,500	\$13,500
20	6-Inch Valve and Valve Box	5	EA	\$3,200	\$16,000
21	4-Inch Valve and Valve Box	7	EA	\$3,000	\$21,000
22	3-Inch Valve and Valve Box	8	EA	\$2,700	\$21,600
23	2-Inch Valve and Valve Box	19	EA	\$2,000	\$38,000
24	Force Main Cleanout	37	EA	\$8,000	\$296,000
25	Air/Vacuum Release Manhole	25	EA	\$15,000	\$375,000
26	Small Main Pump Station	6	EA	\$65,000	\$390,000
27	Medium Main Pump Station	2	EA	\$400,000	\$800,000
28	Large Main Pump Station	2	EA	\$500,000	\$1,000,000
29	Dewittville Creek Crossing	1	LS	\$35,000	\$35,000
30	Road Reconstruction	10,000	LF	\$200	\$2,000,000
31	Land Acquisition	1	LS	\$200,000	\$200,000
Subtotal of Items					\$19,246,000
Inflation to Construction				6%	\$1,155,000
Contractor General Conditions				5%	\$963,000
Construction Subtotal					\$21,364,000
Contingency				25%	\$5,341,000
Engineering/Legal/Administrative				18%	\$3,846,000
ESTIMATED TOTAL PROJECT COST					\$30,551,000

**Collection System Alternative No. 2 - Low-Pressure Collection System
 Option 2 - All Flow to SCCLSD WWTP without Potential Golf Course Development**

Item	Description	QTY	Unit	Unit Cost	Total
1	8-inch SDR 35 PVC Sewer	900	LF	\$100	\$90,000
2	Gravity Sewer Trenching	900	LF	\$50	\$45,000
3	Standard 4-Foot Manhole	5	EA	\$6,000	\$30,000
4	Gravity Wye Connection	25	EA	\$750	\$18,750
5	6-Inch SDR 35 PVC Sewer Lateral	700	LF	\$50	\$35,000
6	8-Inch DR 11 HDPE Pressure Sewers	20,400	LF	\$70	\$1,428,000
7	6-Inch DR 11 HDPE Pressure Sewers	5,500	LF	\$60	\$330,000
8	4-Inch DR 11 HDPE Pressure Sewers	7,500	LF	\$45	\$337,500
9	3-Inch DR 11 HDPE Pressure Sewers	7,200	LF	\$40	\$288,000
10	2-Inch DR 11 HDPE Pressure Sewers	20,450	LF	\$35	\$715,750
11	1.25-Inch DR 11 HDPE Pressure Sewers	36,300	LF	\$30	\$1,089,000
12	Simplex Grinder Pump Stations	274	EA	\$15,000	\$4,110,000
13	Simplex Grinder Pump Lateral Kits	274	EA	\$2,000	\$548,000
14	Duplex Grinder Pump Stations	5	EA	\$24,000	\$120,000
15	Duplex Grinder Pump Lateral Kits	5	EA	\$2,000	\$10,000
16	Grinder Pump Electrical Services	279	EA	\$15,000	\$4,185,000
17	8-Inch Valve and Valve Box	20	EA	\$4,500	\$90,000
18	6-Inch Valve and Valve Box	5	EA	\$3,200	\$16,000
19	4-Inch Valve and Valve Box	7	EA	\$3,000	\$21,000
20	3-Inch Valve and Valve Box	7	EA	\$2,700	\$18,900
21	2-Inch Valve and Valve Box	20	EA	\$2,000	\$40,000
22	Force Main Cleanout	35	EA	\$8,000	\$280,000
23	Air/Vacuum Release Manhole	25	EA	\$15,000	\$375,000
24	Small Main Pump Station	6	EA	\$65,000	\$390,000
25	Medium Pump Station	2	EA	\$400,000	\$800,000
26	Large Main Pump Station	2	EA	\$500,000	\$1,000,000
27	Dewittville Creek Crossing	1	LS	\$35,000	\$35,000
28	Road Reconstruction	10,000	LF	\$200	\$2,000,000
29	Land Acquisition	1	LS	\$200,000	\$200,000
Subtotal of Items					\$18,646,000
Inflation to Construction				6%	\$1,119,000
Contractor General Conditions				5%	\$933,000
Construction Subtotal					\$20,698,000
Contingency				25%	\$5,175,000
Engineering/Legal/Administrative				18%	\$3,726,000
ESTIMATED TOTAL PROJECT COST					\$29,599,000

Appendix S

NYSEFC Smart Growth Assessment Form



Smart Growth Assessment Form

This form should be completed by an authorized representative of the applicant, preferably the project engineer or other design professional.¹

Section 1 – General Applicant and Project Information

Applicant:

Project No.:

Project Name:

Is project construction complete? Yes, date:

No

Please provide a brief project summary in plain language including the location of the area the project serves:

Section 2 – Screening Questions

A. Prior Approvals

- Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? Yes No
- If yes to A(1), what is the project number(s) for the prior approval(s)? Project No.:
- If yes to A(1), is the scope of the previously-approved project substantially the same as the current project? Yes No

If your responses to A(1) and A(3) are both yes, please proceed to Section 5, Signature.

B. New or Expanded Infrastructure

- Does the project involve the construction or reconstruction of new or expanded infrastructure? Yes No

Examples of new or expanded infrastructure include, but are not limited to:

- (i) The addition of new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant where none existed previously;
- (ii) An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing wastewater treatment system; and OR

¹ If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

- (iii) An increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant.

If your response to B(1) is no, please proceed to Section 5, Signature.

Section 3 –Smart Growth Criteria

Your project must be consistent will all relevant Smart Growth criteria. For each question below please provide a response and explanation.

1. Does the project use, maintain, or improve existing infrastructure?
 Yes No

Explain your response:

2. Is the project located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center, as such terms are defined herein (please select one response)?

Yes, my project is located in a municipal center, which is an area of concentrated and mixed land uses that serves as a center for various activities, including but not limited to: central business districts, main streets, downtown areas, brownfield opportunity areas (see www.dos.ny.gov for more information), downtown areas of local waterfront revitalization program areas (see www.dos.ny.gov for more information), areas of transit-oriented development, environmental justice areas (see www.dec.ny.gov/public/899.html for more information), and hardship areas (projects that primarily serve census tracts or block numbering areas with a poverty rate of at least twenty percent according to the latest census data).

Yes, my project is located in an area adjacent to a municipal center which has clearly defined borders, is designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibits strong land use, transportation, infrastructure, and economic connections to an existing municipal center.

Yes, my project is located in an area designated as a future municipal center in a municipal or comprehensive plan and is appropriately zoned in a municipal zoning ordinance

No, my project is not located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center.

Explain your response and reference any applicable plans:

3. Is the project located in a developed area or an area designated for concentrated infill development in a municipally-approved comprehensive land use plan, local waterfront revitalization plan, and/or brownfield opportunity area plan?

Yes No

Explain your response and reference any applicable plans:

4. Does the project protect, preserve, and enhance the State's resources, including surface and groundwater, agricultural land, forests, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources?

Yes No

Explain your response:

5. Does the project foster mixed land uses and compact development, downtown revitalization, brownfield redevelopment, the enhancement of beauty in public spaces, the diversity and affordability of housing in proximity to places of employment, recreation and commercial development, and the integration of all income and age groups?

Yes No

Explain your response:

6. Does the project provide mobility through transportation choices including improved public transportation and reduced automobile dependency?

Yes No N/A

Explain your response:

7. Does the project involve coordination between State and local government, intermunicipal planning, or regional planning?

Yes No

Explain your response and reference any applicable plans:

8. Does the project involve community-based planning and collaboration?

Yes No

Explain your response and reference any applicable plans:

9. Does the project support predictability in building and land use codes?

Yes No N/A

Explain your response:

10. Does the project promote sustainability by adopting measures such as green infrastructure techniques, decentralized infrastructure techniques, or energy efficiency measures?

Yes No

Explain your response and reference any applicable plans:

11. Does the project mitigate future physical climate risk due to sea-level rise, storm surges, and/or flooding, based on available data predicting the likelihood of future extreme weather events, including hazard risk analysis data, if applicable?

Yes No

Explain your response and reference any applicable plans:

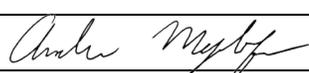
Section 4 – Miscellaneous

1. Is the project expressly required by a court or administrative consent order? Yes No

If yes, and you have not previously provided the applicable order to EFC/DOH, please submit it with this form.

Section 5 – Signature

By signing below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant:	Phone Number:
Name and Title of Signatory:	
Signature: 	Date:

Appendix T

Estimated Project Financing and Annual User Costs

**Collection System Alternative No. 1 - "Hybrid" Collection System
 Option 1 - All Flow to SCCLSD WWTP with Potential Golf Course Development**

Alt. No. 1 - "Hybrid" Collection System Option 1 - All Flow to SCCLSD WWTP	\$31,192,000				
SCCLSD WWTP and Collection System	\$4,445,000				
Total Estimated Project Cost	\$35,637,000				
	Scenario No. 1: EFC Hardship Loan & 75% Grant	Scenario No. 2: EFC Hardship Loan & 62.5% Grant	Scenario No. 3: EFC Hardship Loan & 50% Grant	Scenario No. 4: EFC Hardship Loan & 25% Grant	Scenario No. 5: EFC Market Rate Loan & No Grant
Interest Rate	0.00%	0.00%	0.00%	0.000%	4.00%
Term Length (Years)	30	30	30	30	30
Percent Grant	75%	62.5%	50%	25%	0%
Total Grant	\$26,727,750	\$22,273,125	\$17,818,500	\$8,909,250	\$0
Total Loan	\$8,909,250	\$13,363,875	\$17,818,500	\$26,727,750	\$35,637,000
Annualized Project Cost	\$296,975	\$445,463	\$593,950	\$890,925	\$2,060,891
No. of Vacant Buildable Parcels 73 Golf Course - Vacant Single Family Home Parcels 39 Yearly Charge per Vacant Buildable Lot \$100 Total Vacant Buildable Lot Debt Service	\$11,200	\$11,200	\$11,200	\$11,200	\$11,200
No. of Vacant Non-Buildable Parcels 147 Yearly Charge per Vacant Non-Buildable Lot \$10 Total Vacant Buildable Lot Debt Service	\$1,470	\$1,470	\$1,470	\$1,470	\$1,470
Annual Total Project Cost Minus Vacant Parcels Charge	\$284,305	\$432,793	\$581,280	\$878,255	\$2,048,221
Est. Number of Occupied EDUs 634.2 Golf Course - Est. Number of Occupied EDUs 188 Est. Yearly Debt Cost per EDU	\$361	\$542	\$722	\$1,084	\$2,507
Est. Yearly O&M and SLA Cost per EDU	\$354	\$354	\$354	\$354	\$354
Est. Future Total Annual Water Cost per EDU	\$715	\$896	\$1,076	\$1,438	\$2,861

**Collection System Alternative No. 1 - "Hybrid" Collection System
 Option 2 - All Flow to SCCLSD WWTP without Potential Golf Course Development**

Alt. No. 1 - "Hybrid" Collection System Option 2 - All Flow to SCCLSD WWTP except Golf Course	\$30,316,000				
SCCLSD WWTP and Collection System	\$4,445,000				
Total Estimated Project Cost	\$34,761,000				
	Scenario No. 1: EFC Hardship Loan & 75% Grant	Scenario No. 2: EFC Hardship Loan & 62.5% Grant	Scenario No. 3: EFC Hardship Loan & 50% Grant	Scenario No. 4: EFC Hardship Loan & 25% Grant	Scenario No. 5: EFC Market Rate Loan & No Grant
Interest Rate	0.00%	0.00%	0.00%	0.000%	4.00%
Term Length (Years)	30	30	30	30	30
Percent Grant	75%	62.5%	50%	25%	0%
Total Grant	\$26,070,750	\$21,725,625	\$17,380,500	\$8,690,250	\$0
Total Loan	\$8,690,250	\$13,035,375	\$17,380,500	\$26,070,750	\$34,761,000
Annualized Project Cost	\$289,675	\$434,513	\$579,350	\$869,025	\$2,010,232
No. of Vacant Buildable Parcels 73 Yearly Charge per Vacant Buildable Lot \$100 Total Vacant Buildable Lot Debt Service	\$7,300	\$7,300	\$7,300	\$7,300	\$7,300
No. of Vacant Non-Buildable Parcels 147 Yearly Charge per Vacant Non-Buildable Lot \$10 Total Vacant Buildable Lot Debt Service	\$1,470	\$1,470	\$1,470	\$1,470	\$1,470
Annual Total Project Cost Minus Vacant Parcels Charge	\$280,905	\$425,743	\$570,580	\$860,255	\$2,001,462
Est. Number of Occupied EDUs 634.2					
Est. Yearly Debt Cost per EDU	\$457	\$685	\$914	\$1,370	\$3,170
Est. Yearly O&M and SLA Cost per EDU	\$354	\$354	\$354	\$354	\$354
Est. Future Total Annual Water Cost per EDU	\$811	\$1,039	\$1,268	\$1,724	\$3,524

Appendix U

Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

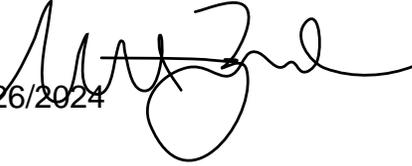
Title of Engineering Report: East Chautauqua Lake Sewer Extension

Date of Report: November 2024

Professional Engineer's Name: Matthew Zarbo

Signature:

Date: 11/26/2024

A handwritten signature in black ink, appearing to read 'Matthew Zarbo', written over the signature label.